Appendix N
Archeological Survey

INTENSIVE ARCHAEOLOGICAL SURVEY OF THE GRAND PARKWAY, SEGMENTS H AND I-1, MONTGOMERY, HARRIS, LIBERTY, AND CHAMBERS COUNTIES

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CSJS: 3510-07-003, 3510-08-001, 3510-09-001, 3510-09-002, 3510-10-001

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Lead Federal Agency: Federal Highway Administration

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Abstract

At the request of HNTB, archaeologist from CDM Smith conducted an intensive archaeological survey of the proposed Grand Parkway Segments H and I-1 located in parts of Montgomery, Harris, Liberty, and Chambers counties, on the northeast side of the greater Houston metropolitan area from US 59 (N) to IH 10 (E) generally between FM 2100 and SH 146.

One previously unknown archaeological site (41MQ300) was discovered. Site 41MQ300 is a low-density, prehistoric scatter representing a short-term occupation by an unidentified cultural group, with a small historic mid-to-late 20th century component consisting of a single metal wire fragment. The sites has limited research potential and is not considered potentially eligible for listing on the National Register of Historical Places (NRHP) under Criterion D. Criteria A, B, and C do not apply. No further archaeological work is recommended for this site.

Over 56% of the APE was not tested. This included parcels where RODS Surveying did not contact the owner, and the area of the alignment shift at FM 1960. These areas will need to be examined by a qualified archaeologist once right of entry has been secured. For the 33% percent of the parcels that were tested, no further archaeological work is recommended.

If archeological materials or human remains are identified within the ROW during construction, or a department-designated material source, all construction and related activities must cease. The find is to be reported to the TxDOT project inspector or the area engineer in accordance with TxDOT's Emergency Discovery Guidelines.

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Acronyms

After Death	A.D.
Area of Potential Effect	APE
Base Flow Evaluation	BFE
Before Christ	B.C.
Before Present	B.P.
Centimeters	cm
County Flood Control District	CFCD
Council of Texas Archaeologist	CTA
Department of Transportation	DOT
Fahrenheit	F
Federal Highway Administration	FHWA
feet per second	fps
Grand Parkway Association	GPA
Geographic Information System	GIS
Geographic Information System Professional	GISP
Harris County Flood Control District	HCFCD
Houston Potential Archaeological Liability Mapping	PALM
Isolated Find	IF
Mile	mi
Millimeters	mm
National Environmental Policy Act	NEPA
National Historic Preservation Act	NHPA
Texas Historical Commission	THC
Texas Department of Transportation	TxDOT
Texas State Historic Preservation Office	SHPO
National Environmental Policy Act	NEPA
National Historic Preservation Act	NHPA
National Register of Historical Places	NRHP
Right-of-Way	ROW
Register of Professional Archaeologist	RPA
Shovel Test Probe	STP
State Archaeological Landmark	SAL
Transportation Planning Report	TPR
United States Geological Survey	USGS
United States Department of Agriculture	USDA

Acknowledgements

J. Howard Beverly, MA, RPA was principal investigator for the archaeological survey. The field director for the archaeological project was Chris Rankin and crew members included J. Howard Beverly, Dona Daugherty, and Mackenzie Sutton.

Section 1 - Introduction

This report describes the field and laboratory methods and results of an intensive archaeological survey conducted for the Grand Parkway Association (GPA) for the proposed Grand Parkway Segments H and I-1 located in parts of Montgomery, Harris, Liberty, and Chambers counties, on the northeast side of the greater Houston metropolitan area from US 59 (N) to IH 10 (E) generally between FM 2100 and SH 146.

This section will present an introduction to and provide an overview of the project.

1.1 Project Goal

The purpose of the intensive archaeological survey is to identify archaeological properties that may be eligible for the National Register of Historic Places (NRHP) as set forth in 36 CFR Part 60 and 36 CFR Part 800, or for designation as a State Archeological Landmark (SAL), as set forth in 13 TAC Chapter 26 (43 TAC 2.24).

An intensive archaeological survey is a pedestrian survey that covers 100% of a project or permit area. Components of an intensive survey may include, but are not limited to, archival research, pedestrian survey, shovel and/or mechanical subsurface probing, surface artifact inventories, site recordation, and site assessment. Such a survey can be performed in many ways but must, at a minimum, conform to the Archeological Survey Standards for Texas (13 TAC 26.20).

The goal of the intensive survey is to identify all archaeological properties that might qualify for listing on the NRHP or the SAL and to record sufficient information to permit their evaluation.

The archaeological research was conducted in compliance with provisions of the National Historic Preservation Act of 1966 (P.L. 89-665; 80 Stat.915, 16 U.S.C. 470 et seq), the National Environmental Policy Act of 1969 (P.L. 910190; 83 Stat. 852, 42 U.S.C. 4321 et seq), Procedures of the Advisory Council on Historic Preservation (36CFR800), and Executive Order 11593, Protection and Enhancement of the Cultural Environment (16 U.S.C. 470; Supp. 1, 1971), and Section 404 of the Clean Water Act (33 U.S.C. § 1251 et seq.).

This report conforms to the reporting standards of 13 TAC 26.24, including satisfaction of the Council of Texas Archeologists (CTA) reporting guidelines.

1.2 Project Background

The Grand Parkway, as a concept, was first proposed in 1961 by Harris County and the City of Houston Planning Commission following traffic studies that identified regional transportation deficiencies. The Grand Parkway corridor was placed on city maps in 1968, but funds were not readily available to advance the project. With the development of the greater Houston metropolitan area, the need for additional transportation facilities became more evident. County officials mapped a proposed corridor for the Grand Parkway and submitted the plan to the Texas Highway Commission.

In 1984, the Texas Legislature authorized the creation and organization of nonprofit transportation corporations to act on behalf of the State Department of Highways and Public Transportation (the predecessor agency to the Texas Department of Transportation [TxDOT]) in the promotion and development of public transportation facilities and systems within the state. The Grand Parkway Association (GPA), the first of these corporations created, was charged with obtaining land and funding to meet the planning, legal, engineering, and right-of-way (ROW) requirements of the Grand Parkway. Since its inception, the GPA has worked directly with landowners, city, county, state, and federal governmental agencies and elected officials in an effort to complete the Grand Parkway.

The Grand Parkway Segments H and I-1 are part of a planned 180+ mile (mi) circumferential loop around the greater Houston metropolitan (Figure 1-1). The Grand Parkway is divided into 11 segments, each of which has logical termini and independent utility to facilitate planning, design, and construction. Due to limited state and federal funding, there is no assurance that all of the Grand Parkway segments would be constructed. Each segment connects at least two existing major transportation corridors to ensure independent utility as well as independent significance as required by the Federal Highway Administration (FHWA) regulations (23 Code of Federal Regulations [CFR] 771.111 (f)). The United States Congress confirmed this segment-by-segment development approach to be in compliance with federal law in the "Department of Transportation and Related Agencies Appropriations Bill of 1993." The April 2003 Texas Transportation Commission Minute Order 109226 states, "The completion of the Grand Parkway is essential and urgent, as construction of the projects would alleviate congestion and improve traffic flow in the greater Houston metropolitan area and the surrounding region" and "The commission has determined that constructing and operating the Grand Parkway as a toll facility is the most efficient and expeditious means of ensuring its development, and encourages the development of partnerships and the employment of innovative methods for its financing and construction."

1.3 Project Location

The Grand Parkway Segments H and I-1 is located in parts of Montgomery, Harris, Liberty, and Chambers counties, on the northeast side of the greater Houston metropolitan area from US 59 (N) to IH 10 (E) generally between FM 2100 and SH 146 (Figure 1-2, Figure 1-3, and Figure 1-4). Segment H begins at US 59 North (N) near New Caney and continues south/southeast to US 90, and is proposed as a 4-mainlane at-grade controlled-access toll highway with proposed grade separations at major intersections within a 400 foot ROW width (Figure 1-5). Segment I-1 begins where Segment H ends at US 90 and continues south to IH 10 East (E) near Mont Belvieu. Segment I-1 is also proposed as a 4-mainlane at-grade controlled-access toll highway with proposed grade separations at major intersections within a 400 foot ROW width (Figure 1-5).

1.4 Area of Potential Effect Definition

The Area of Potential Effects (APE) is the geographic area or areas within which an undertaking may cause changes in the character or use of historic properties, as that term is defined in 36 CFR Part 800, if any such properties exist. The APE for archeological properties on federal undertakings is confined to the limits of the proposed project right-of-way (including permanent and temporary easements), utility relocations, and project-specific locations designated by TxDOT (43 TAC 2.24).

The APE for this project is defined as the proposed ROW encompassing 1,978 acres (800 hectares).

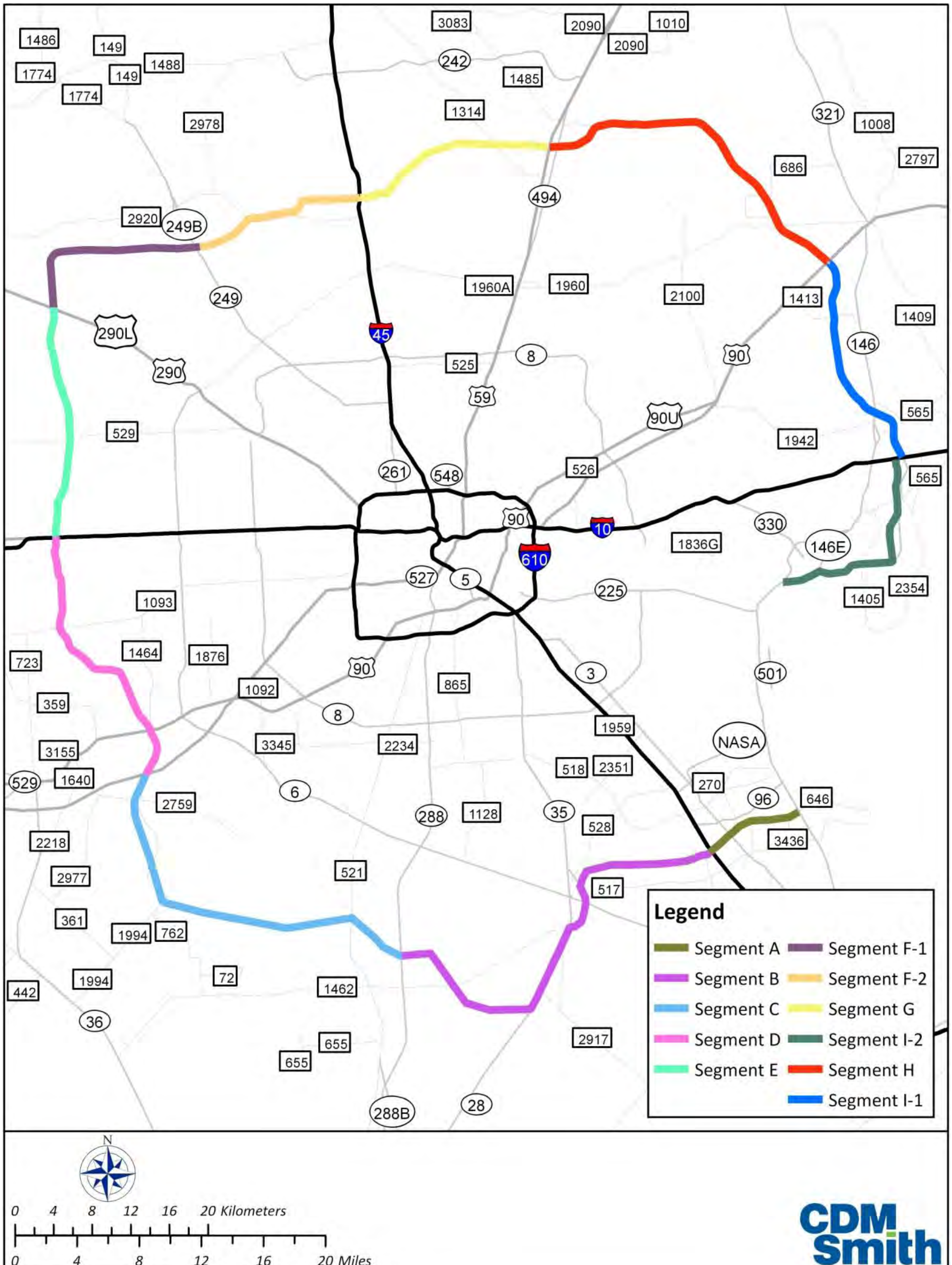


Figure 1-1. Grand Parkway Segments A through I-2.

Figure 1-2. Project Location within Texas.

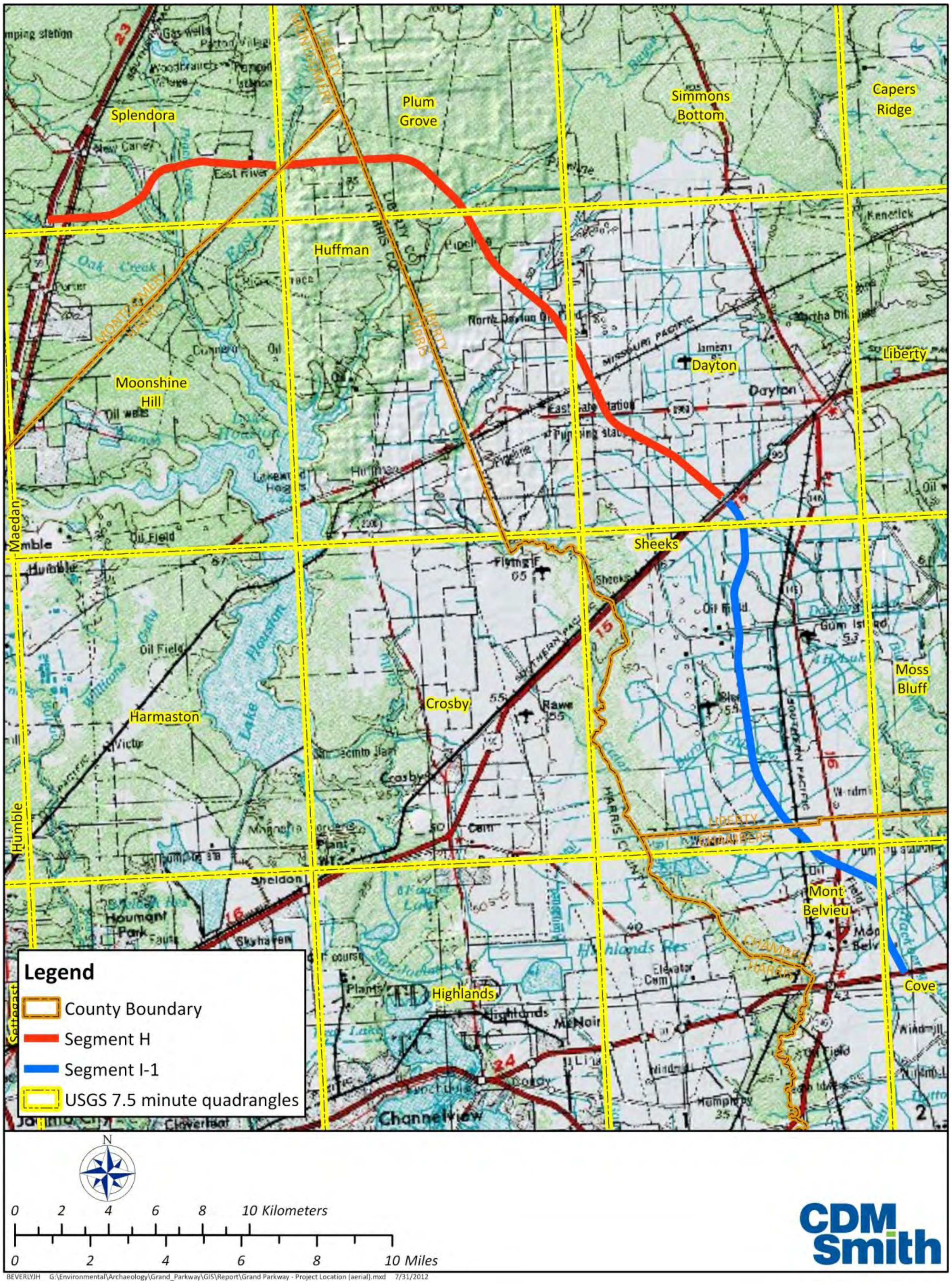


Figure 1-3. APE on USGS Quadrangles.

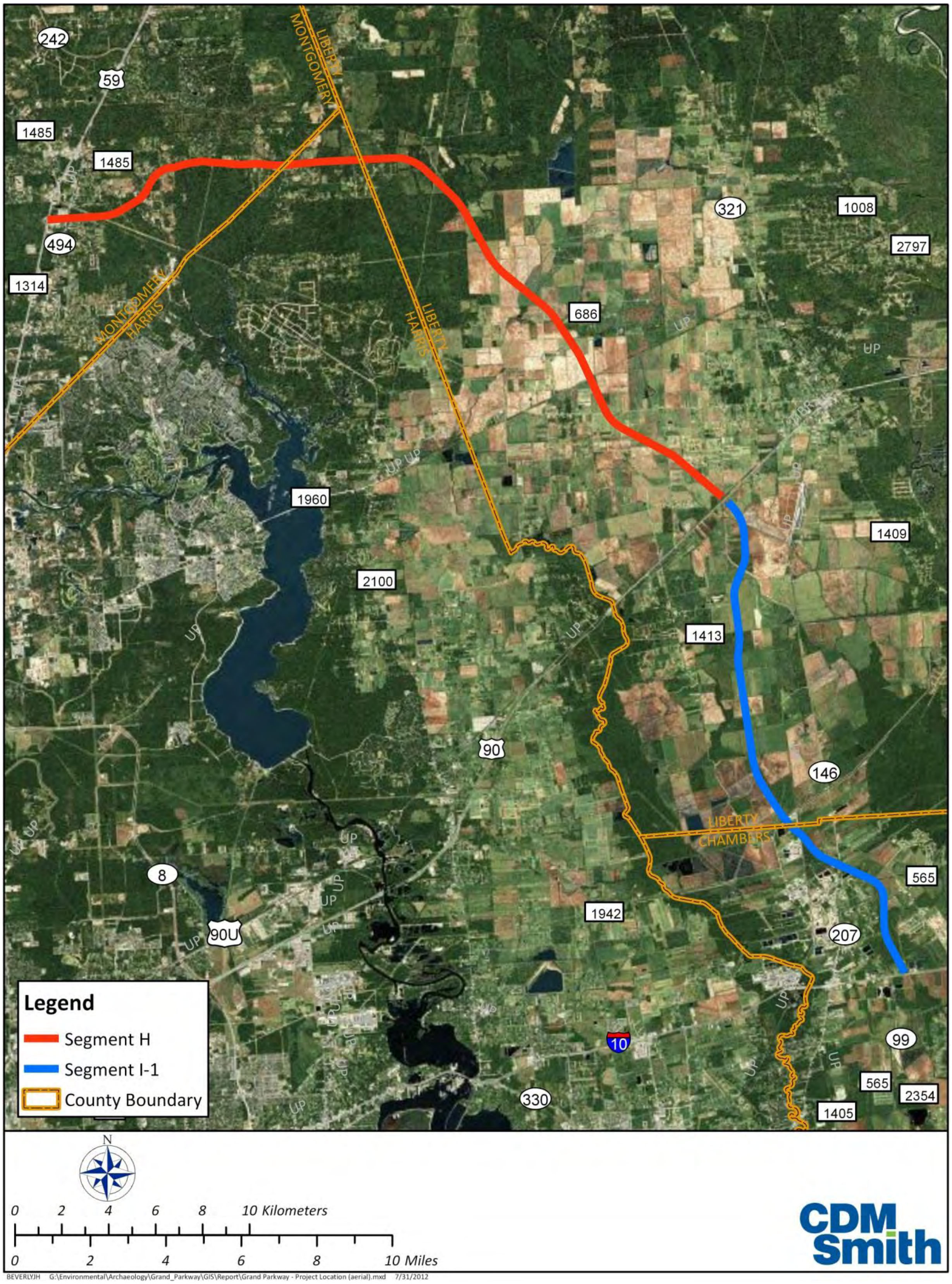
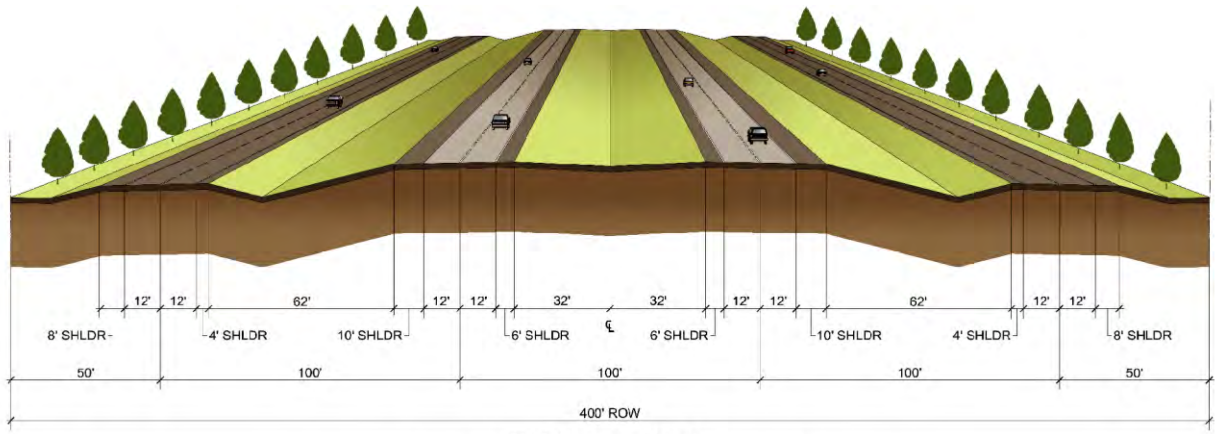
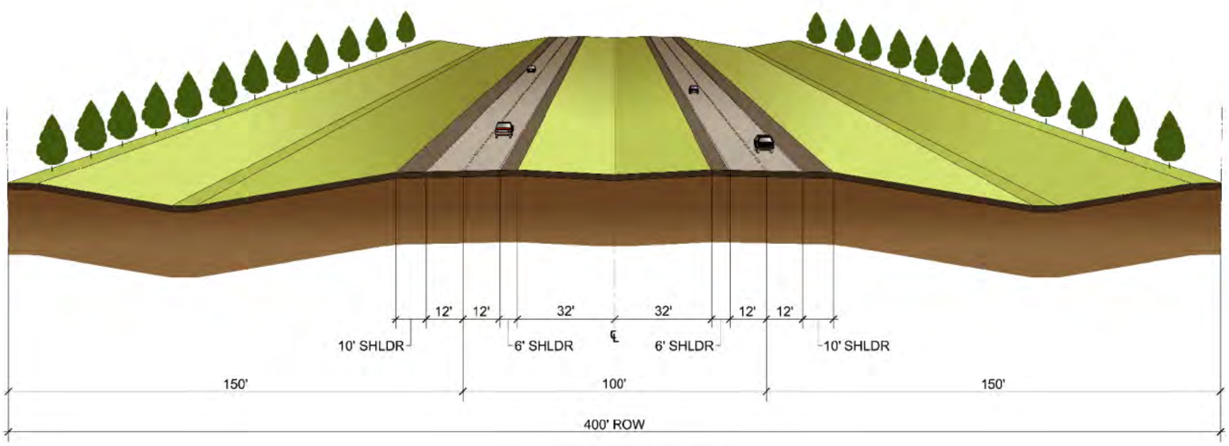


Figure 1-4. Aerial Photograph showing APE.



With Frontage Roads
Note: Frontage Roads Only Where Needed



Without Frontage Roads

Figure 1-5. Proposed Typical Sections.

1.5 Project Sponsor

The sponsor for this project is the Texas Department of Transportation (TxDOT) and the Grand Parkway Association (GPA).

1.6 Personnel

The personnel for this project comprised archaeologists from the Lexington, Kentucky, office of CDM Smith.

1.6.1 Principal Investigator

The principal investigator for this study was Mr. J. Howard Beverly, RPA, GISP. Mr. Beverly planned and supervised field and laboratory activities and, as needed, directed additional effort to determine eligibility status.

1.6.2 Field and Laboratory Crew

The field director for this project was Mr. Chris Rankin. He was aided in the field work by Dona Daugherty, J. Howard Beverly, and Mackenzie Sutton.

1.7 Background Research Dates

The Texas Archeological Sites Atlas, maintained by the Texas Historical Commission (THC) was accessed at various times during the duration of the project to identify previously recorded archeological sites and historic properties, and previous archeological work in the vicinity of the APE.

1.8 Field Survey Dates

Archaeological fieldwork was conducted between June 21 and July 3rd 2012.

1.9 Exhibit Preparations and Maps

Maps and figures for this report were prepared using a combination of Microstation design files, GIS data overlays, and databases gathered from a number of different resources. All GIS work was conducted by Mr. J. Howard Beverly, GISP.

1.10 Curation Information

All Archeological field notes, photographs and artifacts will be curated at the Texas Archaeological Research Laboratory at the University of Texas, Austin.

1.11 Overview of Findings

One previously unknown archaeological site (41MQ300) was discovered. Site 41MQ300 is a low-density, prehistoric scatter representing a short-term occupation by an unidentified cultural group, with a small historic mid-to-late 20th century component consisting of a single metal wire fragment. The sites has limited research potential and is not considered potentially eligible for listing on the National Register of Historical Places (NRHP) under Criterion D. Criteria A, B, and C do not apply. No further archaeological work is recommended for this site.

Over 56% of the APE was not tested. This included parcels where RODS Surveying did not contact the owner, and the area of the alignment shift at FM 1960. These areas will need to be examined by a qualified archaeologist once right of entry has been secured. For the 33% percent of the parcels that were tested, no further archaeological work is recommended.

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Section 2 - Environmental Background

This section describes the present environment and setting of the project area and how the prehistoric and historic environment may have differed from the contemporary environment.

2.1 Geology

The APE, from northwest to southeast, is geologically characterized as the Lissie (Ql) and Beaumont (Qb) Formations, respectively, which were deposited during the Quaternary Period, less than two million years ago (Figure 2-1). Prior to this period over 200 million years ago, dry climatic conditions resulted in evaporation of the sea, and salt was subsequently deposited over the area. Two salt domes, the Esperson Dome northwest of Dayton and the Barbers Hill Dome near Mont Belvieu, are prominent in the area of the APE. Several oil fields are located throughout the APE, including in the area of Splendora, Dayton, and Mont Belvieu (Stoeser et al. 2005).

Caney Creek, Peach Creek, the East Fork of the San Jacinto River and the lower portion of the Lake Houston Park are characterized on the Beaumont Sheet of the Geologic Atlas of Texas, as the Deweyville Formation (Qd) and Alluvium (Qal) (Figure 2-1). The Deweyville Formation consists of sand, silt, and clay with some gravel and includes point bars, natural levees, stream channels, and back swamps slightly above the current floodplain. The Alluvium includes clay, silt, and sand with organic matter (Stoeser et al. 2005).

The northern portion of Lake Houston Park and the northern part of the APE is characterized as the Lissie Formation which consists of clay, silt, sand with gravel, pebbles, and calcareous and iron manganese concretions (Figure 2-1). The remainder of the study area to the east and south is made up of the Beaumont Formation. The portion of the study area south of US 90 can be found on the Geologic Site Atlas, Houston Sheet. The Beaumont Formation is characterized by mostly clay, silt, and sand and includes mainly stream channels, point bars, natural levees, back swamps, and some coastal marsh and mud-flat deposits (Stoeser et al. 2005).

2.2 Physiography

There are seven physiographic provinces in Texas. Each physiographic province has characteristic geologic structure, rock and soil types, vegetation, and climate. The APE is located in the southeast part of Texas in the Coastal Prairies of Texas, which consists of a nearly level topographic setting, bisected by many rivers, creeks, bayous, and floodplains (Wermund 1996). A portion of this region to the north is part of the Big Thicket, a forested area with a wide variety of trees including pine, oak, ash, hickory, cypress, and walnut trees (Wermund 1996). The southern section contains Gulf prairies and marshes (Wermund 1996).

2.3 Ecology

The APE lies at the southern edge of the South Central Plains and the northern and eastern portion of the Western Gulf Coast Plain Level 3 ecological regions (Figure 2-2). Locally termed the “piney woods”, the South Central Plains consists of mostly irregular plains represents the western edge of the southern coniferous forest belt. Once blanketed by a mix of pine and hardwood forests, much of the

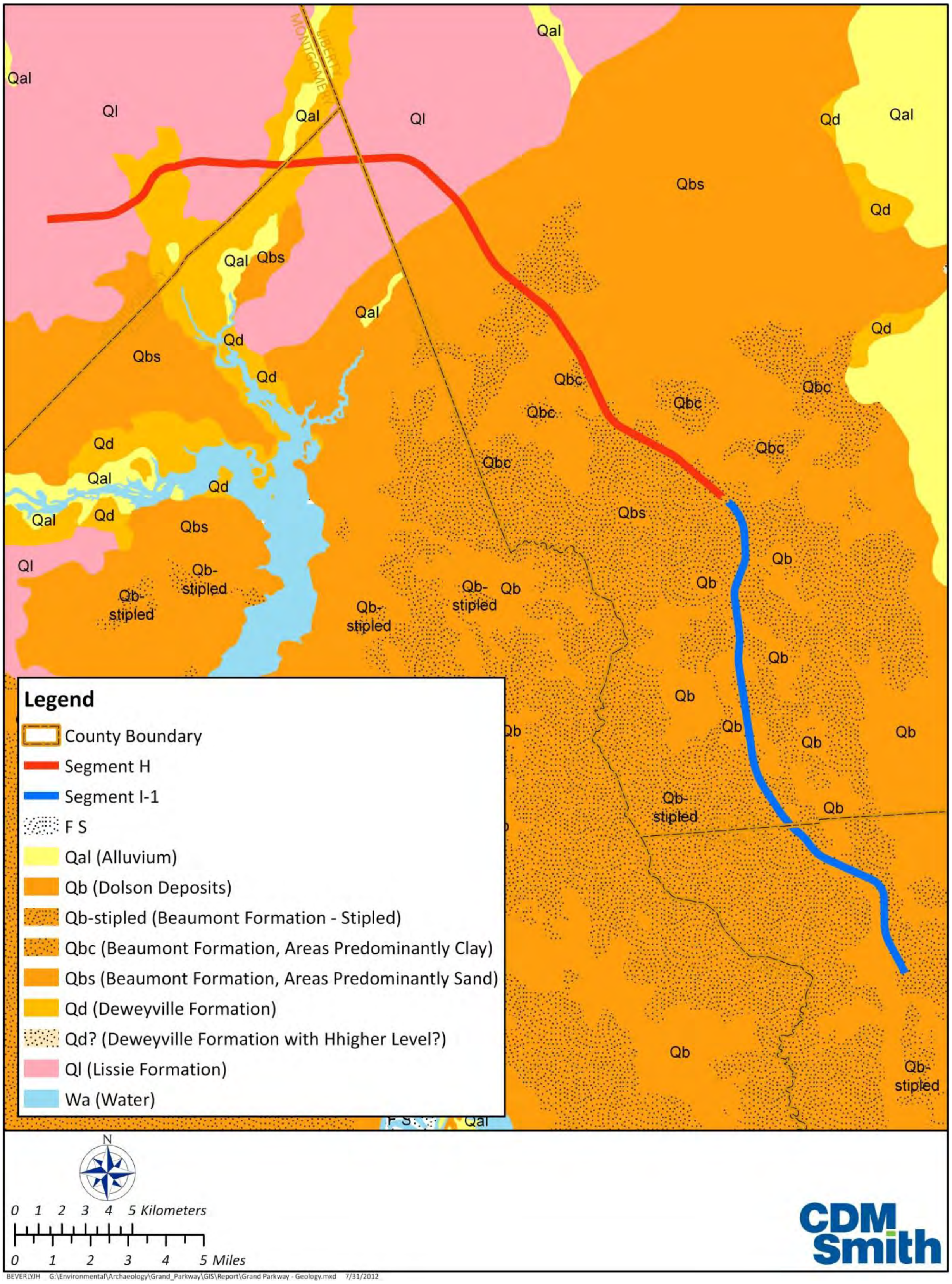

Figure 2-1. Geology of the Project Area.

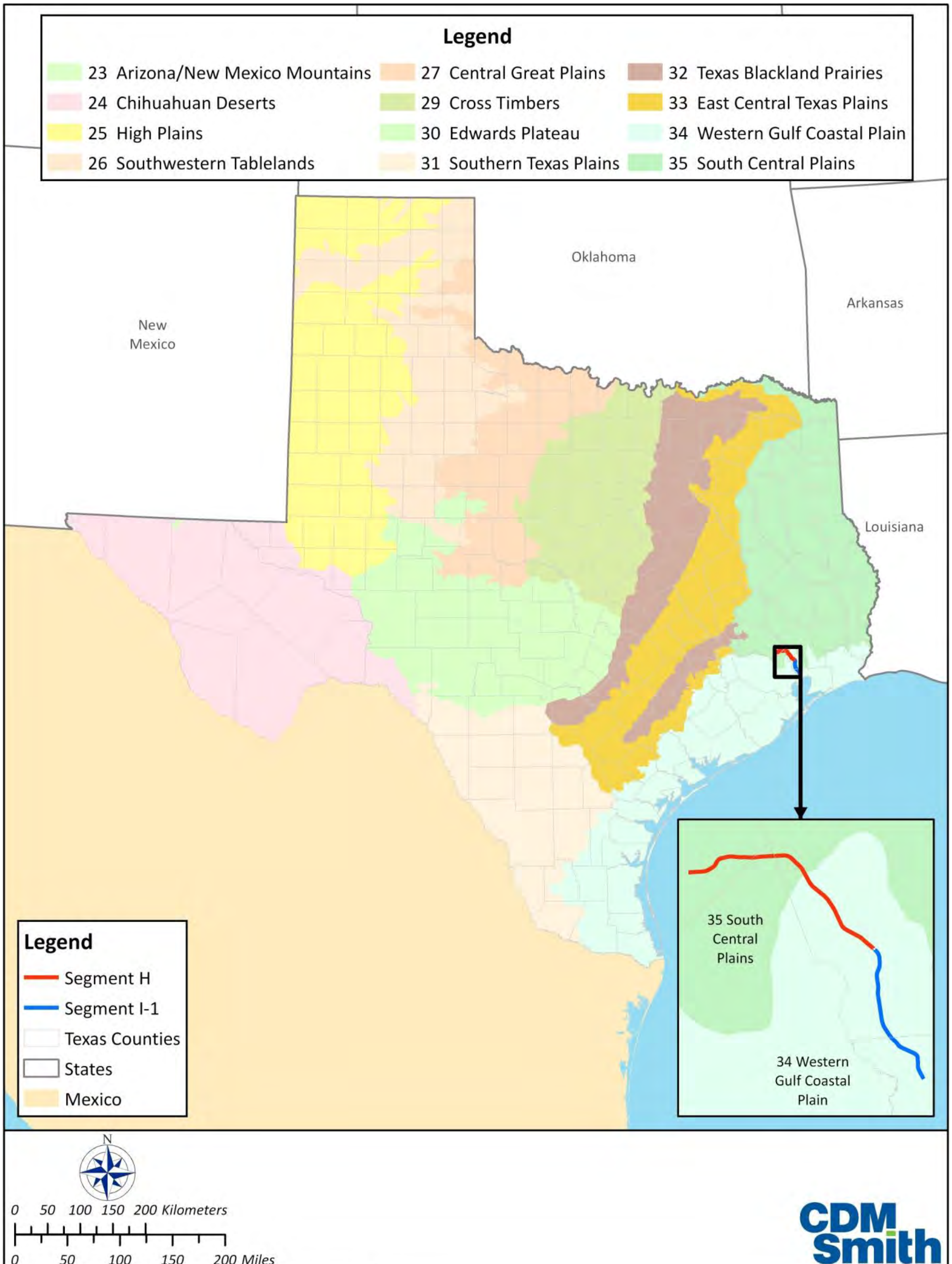

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Figure 2-2. Level III Ecoregions.

region is now in loblolly and shortleaf pine plantations. Soils are mostly acidic sands and sandy loams. Covering parts of Louisiana, Arkansas, east Texas, and Oklahoma, only about one sixth of the region is in cropland, primarily within the Red River floodplain, while about two thirds of the region is in forests and woodland. Lumber, pulpwood, oil, and gas production are major economic activities (Griffith et al. 2006).The principal distinguishing characteristics of the Western Gulf Coastal Plain are its relatively flat topography and mainly grassland potential natural vegetation. Inland from this region the plains are older, more irregular, and have mostly forest or savannah-type vegetation potentials. Largely because of these characteristics, a higher percentage of the land is in cropland than in bordering ecological regions. Rice, grain sorghum, cotton, and soybeans are the principal crops. Urban and industrial land uses have expanded greatly in recent decades, and oil and gas production is common (Griffith et al. 2004b).

The APE crosses two Level IV ecoregions, the Northern Humid Gulf Coastal Prairies (34a) and the Flatwoods (35f). The Northern Humid Gulf Costal Prairies (34a) is underlain by quaternary deltic sands, silts, and clays (Figure 2-3). The original vegetation of this zone was mostly grasslands with a few clusters of oaks, known as oak mottes or maritime woodlands. The dominant grassland species included little bluestem, yellow Indiangrass, brownseed paspalum, gulf muhly, and switchgrass. Today, this region is dominated by cropland, rangeland, pasture, or used for various domestic purposes. Some loblolly pine occurs in the northern part of the region where it transitions to the South Central Plains (35) ecoregion. The soils of this region are mostly fine textured and consist of clay, clay loam or sandy clay loam. Within the region, there are some geological differences in the higher Lissie Formation to the lower Beaumont Formation, both of Pleistocene age. The Lissie Formation has lighter colored soils, mostly Alfisols with sandy clay loam. The Beaumont Formation, on the other hand, has darker, clayey soils associated with Vertisols (Griffith et al. 2004a).

The Flatwoods (35f) ecoregion occurs on Pleistocene sediments in southeast Texas and in southwest Louisiana. Soils in this region originate from Pleistocene Lissie Formation are generally more clayey, poorly drained, and more acidic than the Miocene Willis Sands found to the north in the Southern Tertiary Uplands (35e). The soils of this region are also less clayey than the Southern Subhumid Gulf Costal Prairies (34b) ecoregion located to the south. The vegetative diversity of the Flatwoods region once contained a mixed pine-hardwood forest. The upland area of the region contained mostly longleaf pine along with sweetgum, white oak, southern red oak, willow oak, blackgum, and hollies. The poorly drained region of the upland had areas of pine of pine savannas and patches of small prairies. The Savanna wetlands on the Montgomery Formation, and the prairie areas on the Beaumont Formation, were most likely larger in this region than the Southern Tertiary Uplands (35e) and Tertiary Uplands (35a) ecoregions located to the north. Beach and magnolia clusters of vegetation were found occurring in narrow areas along some streams and on mesic slopes. It contained a higher percentage of pine than in similar regions to the east. Today there is less beech and more swamp chestnut oak in this region. Loblolly pine and laurel oak also are also found in mesic habitats and in other areas. This region is warmer, wetter, flatter, less dissected, and lower in elevation than the Tertiary Uplands (35a) and the Southern Tertiary Uplands (35e) ecoregions found to the north. Streams are low gradient and sluggish. Almost all of the Big Thicket National Preserve is within this region (Griffith et al. 2004a).

2.4 Soils

Soils are the primary contact point between living organisms and are a biologically, chemically, and physically active portion of the environment. Soil is a display of thousands of years of decomposition and weathering resulting in the product of a living ecosystem. Because of unique processes that occur

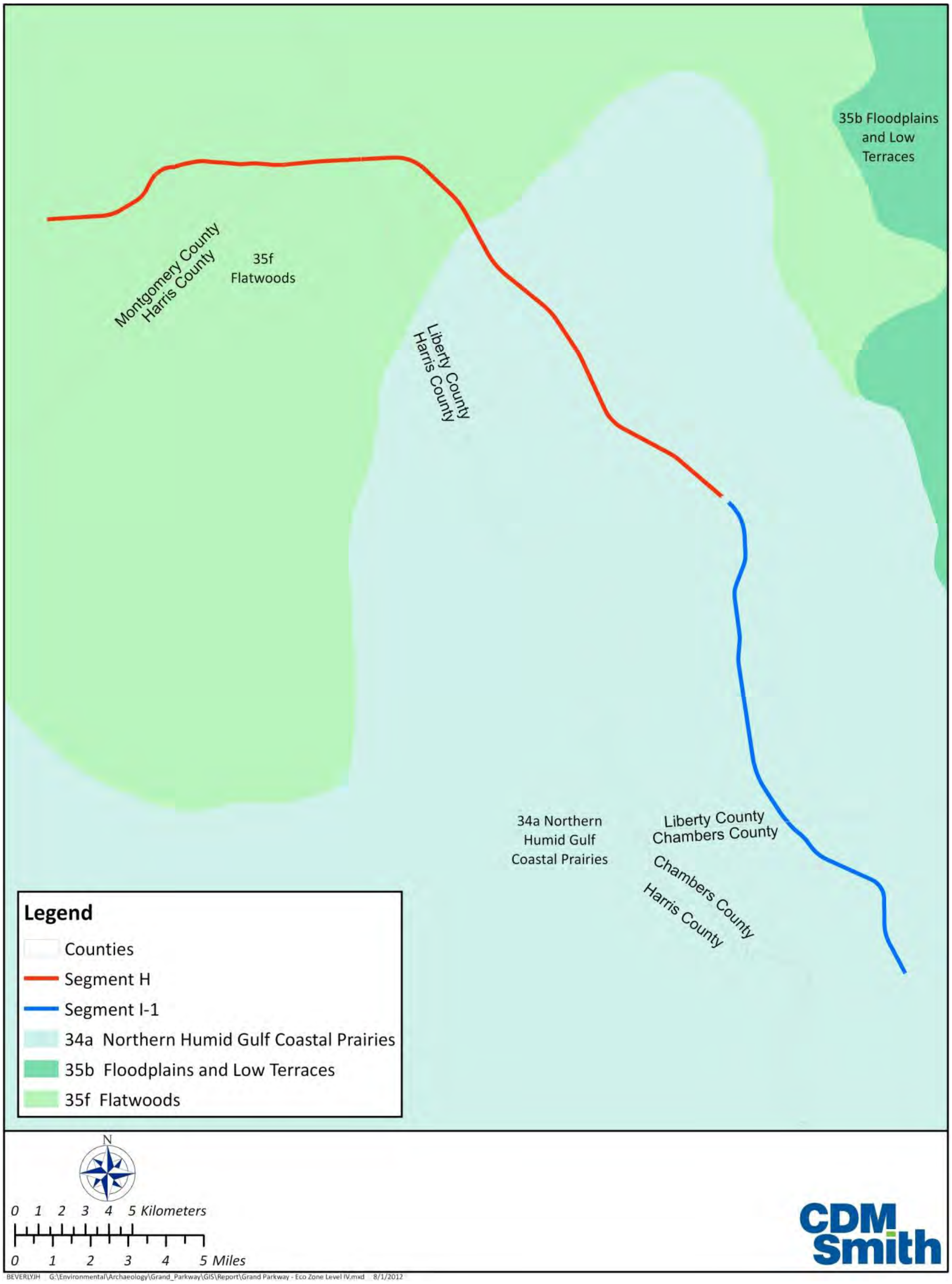


Figure 2-3. Level IV Ecoregions.

as water infiltrates and percolates through the soil profile, such as ion exchange, microbial digestion and plant nutrient uptake, water is filtered of many impurities. Soil, therefore, serves as a pollution barrier for the ecosystem as it filters runoff. The various soils found within the APE are described below, grouped by county, and are shown in Figure 2-4 through Figure 2-21.

2.4.1 Montgomery County Soils

Dominant soil associations included in the APE within Montgomery County include the Splendora-Boy-Segno association and the Sorter association. The Splendora-Boy-Segno association consists of deep, nearly level to gently sloping, somewhat poorly drained to well drained, loamy and sandy soils that have loamy lower layers. The Sorter association consists of deep, level, poorly drained soils that are loamy throughout.

Landman fine sand (Ab) is made up of one major component, Landman. Slopes are 0 to 3 percent. This component is on stream terraces on coastal plains. The parent material consists of loamy alluvium and/or sandy alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 60 inches during January, February, March, April, May, October, November, and December. Organic matter content in the surface horizon is about 1 percent. Non-irrigated land capability classification is 3s. This soil does not meet hydric criteria (USDA 2012).

Bibb soils, frequently flooded (Bb) is made up of one major complex, Bibb (95%), and an unnamed, minor component (5%). The Bibb component makes up 95 percent of the map unit. Slopes are 0 to 1 percent. This component is on flood plains on coastal plains. The parent material consists of loamy alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is frequently flooded. It is not ponded. A seasonal zone of water saturation is at 9 inches during January, February, March, April, and December. Organic matter content in the surface horizon is about 2 percent. Non-irrigated land capability classification is 5w. This soil meets hydric criteria (USDA 2012).

Boy fine sand (Bo) is made up of one major complex. The Boy component makes up 100 percent of the map unit. Slopes are 0 to 5 percent. This component is on interfluves on coastal plains. The parent material consists of sandy marine deposits and/or loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 54 inches during January, February, November, and December. Organic matter content in the surface horizon is about 1 percent. Non-irrigated land capability classification is 3s. This soil does not meet hydric criteria (USDA 2012).

Bruno loamy fine sand (Br) is made up of one major component. The Bruno component makes up 100 percent of the map unit. Slopes are 0 to 1 percent. This component is on flood plains on coastal plains. The parent material consists of sandy alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is excessively drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is frequently flooded. It is not ponded. A seasonal zone of water saturation is at 60 inches during

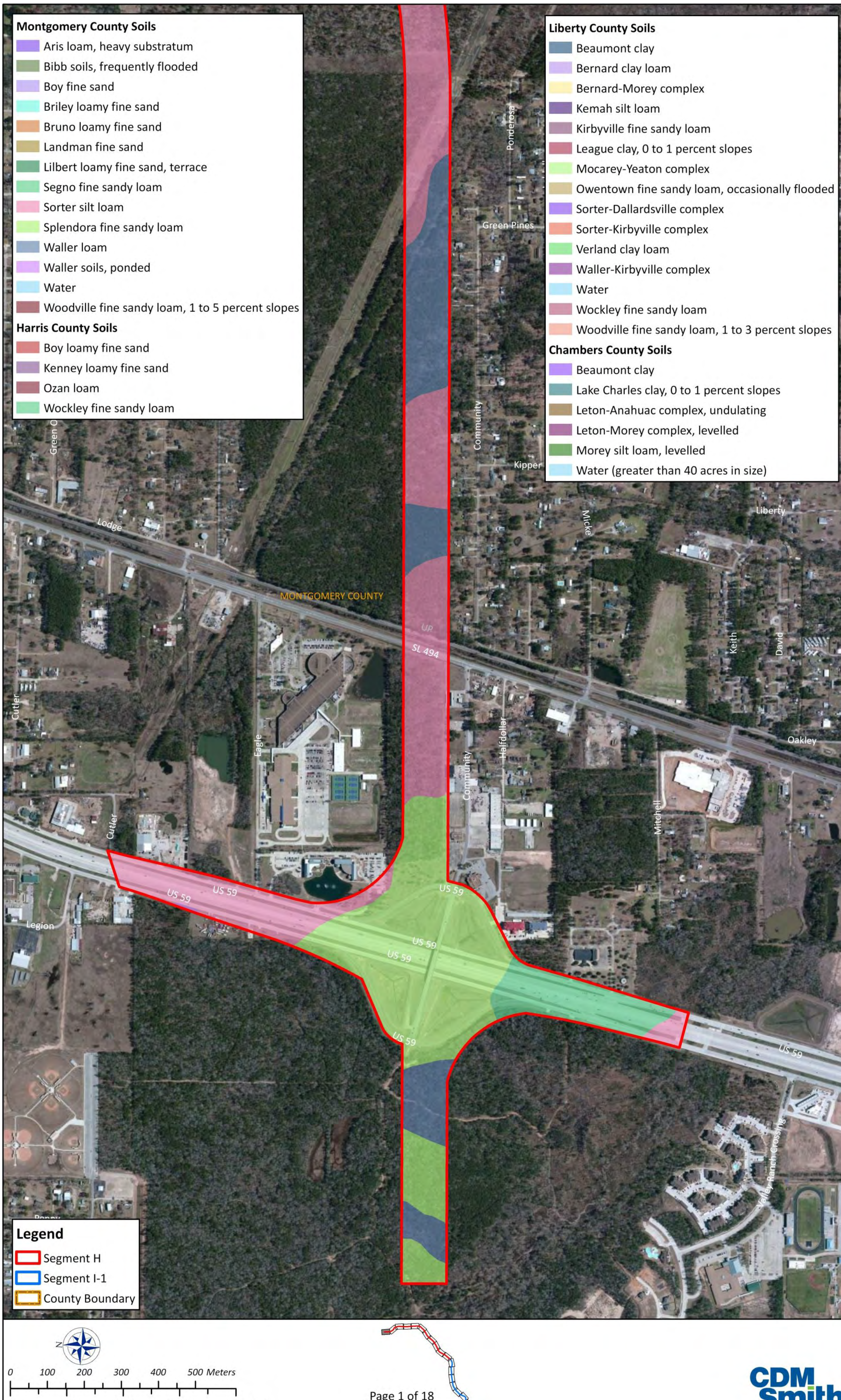


Figure 2-4. Soils within the APE, Page 1 of 18.

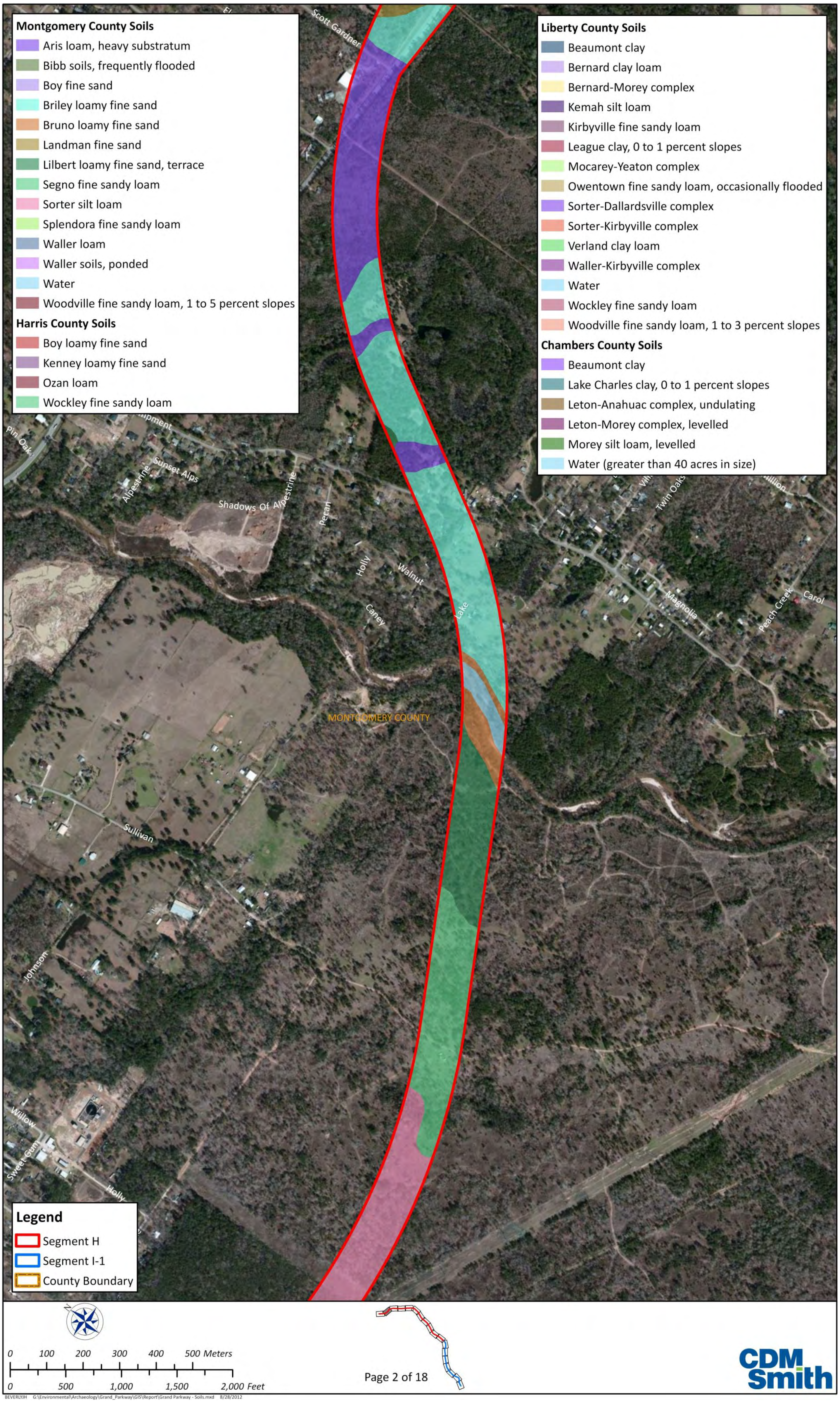


Figure 2-5. Soils within the APE, Page 2 of 18.

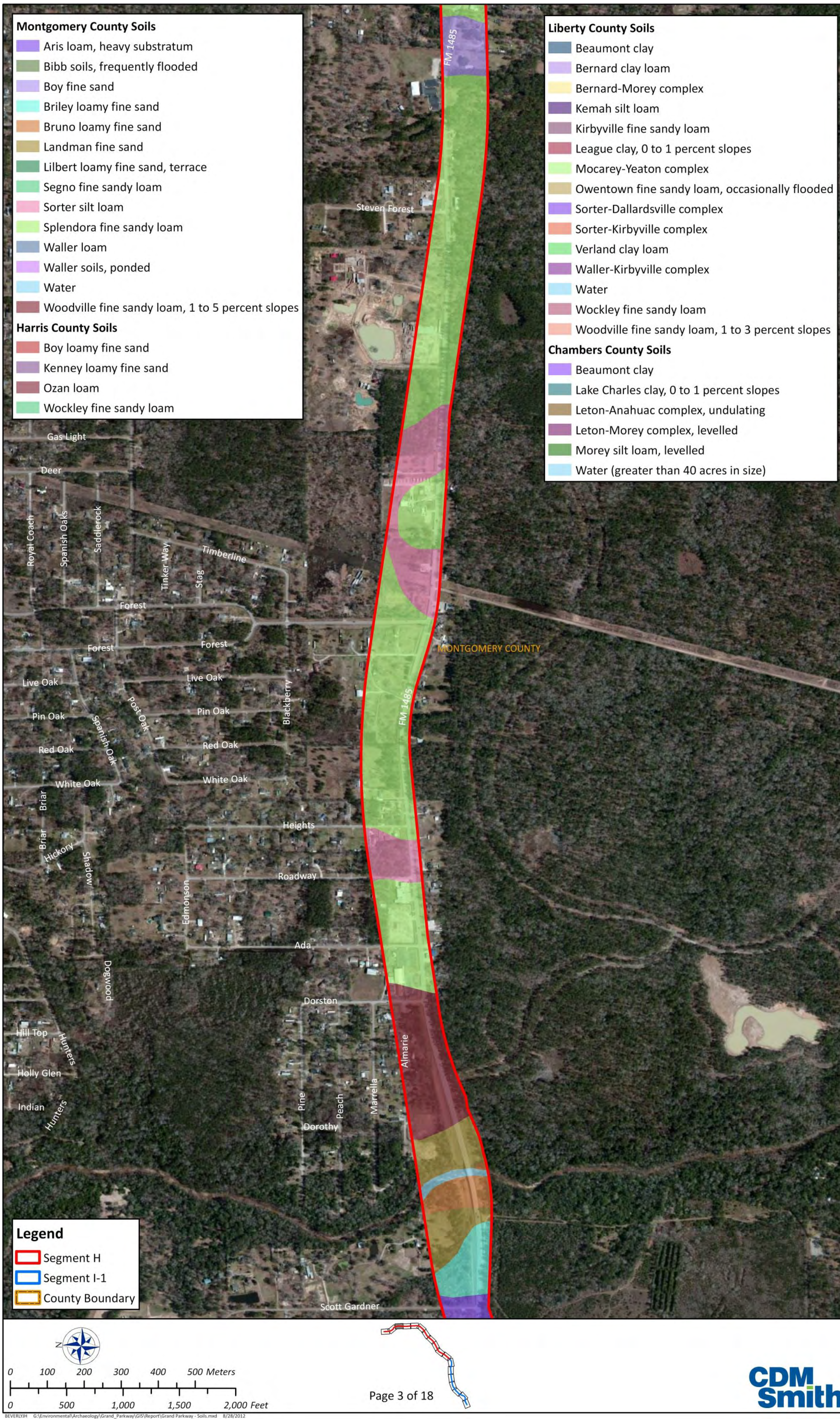


Figure 2-6. Soils within the APE, Page 3 of 18.

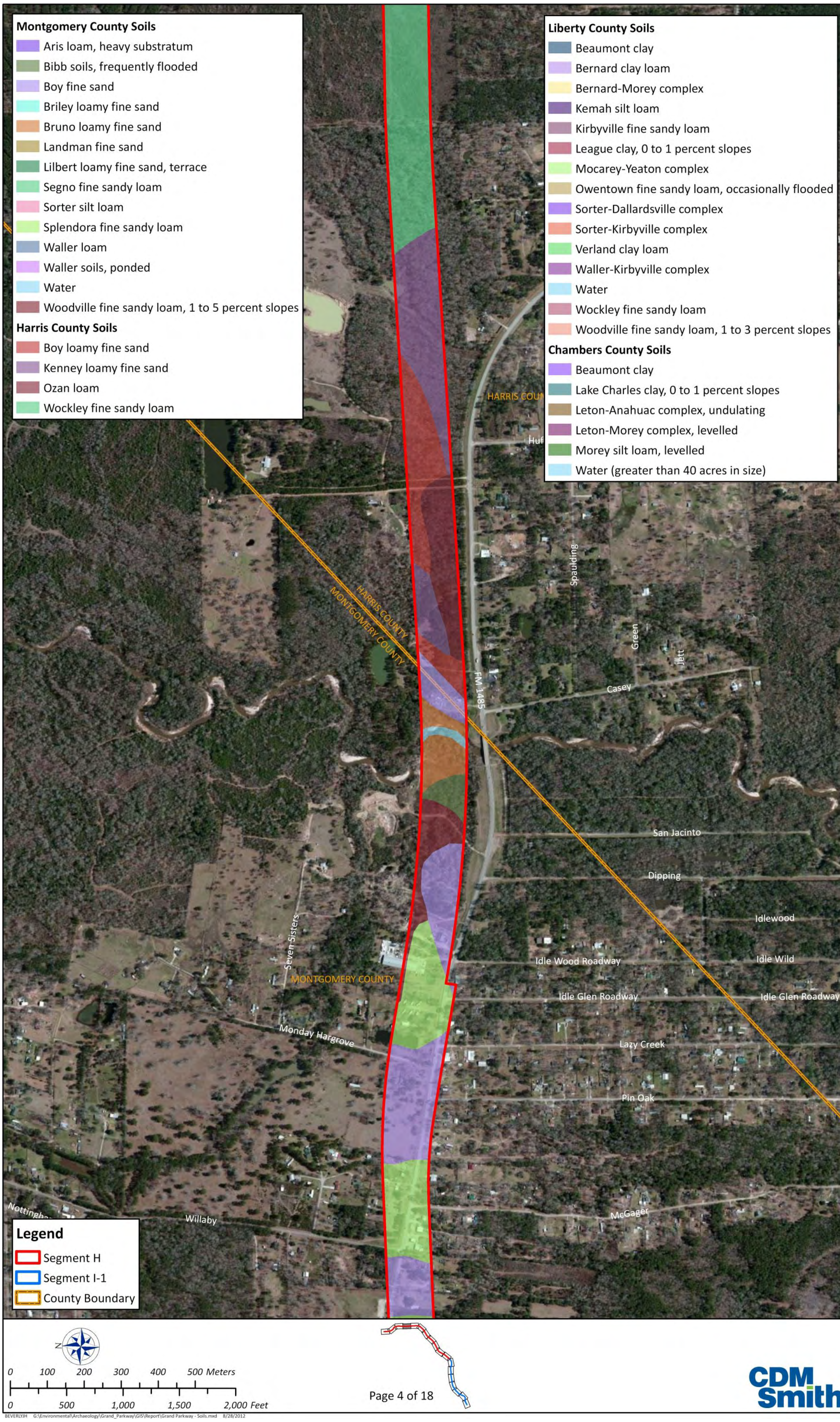


Figure 2-7. Soils within the APE, Page 4 of 18.

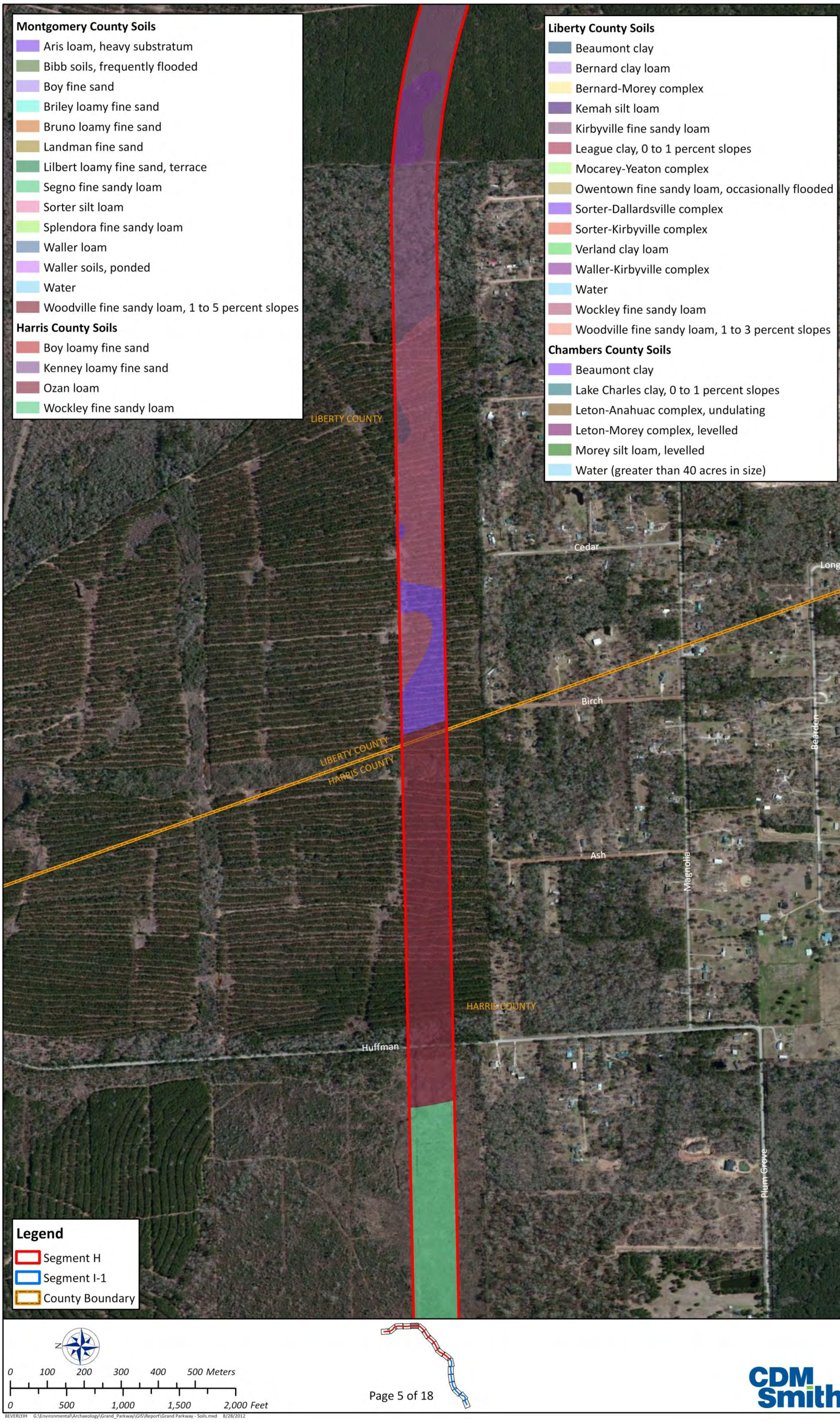


Figure 2-8. Soils within the APE, Page 5 of 18.

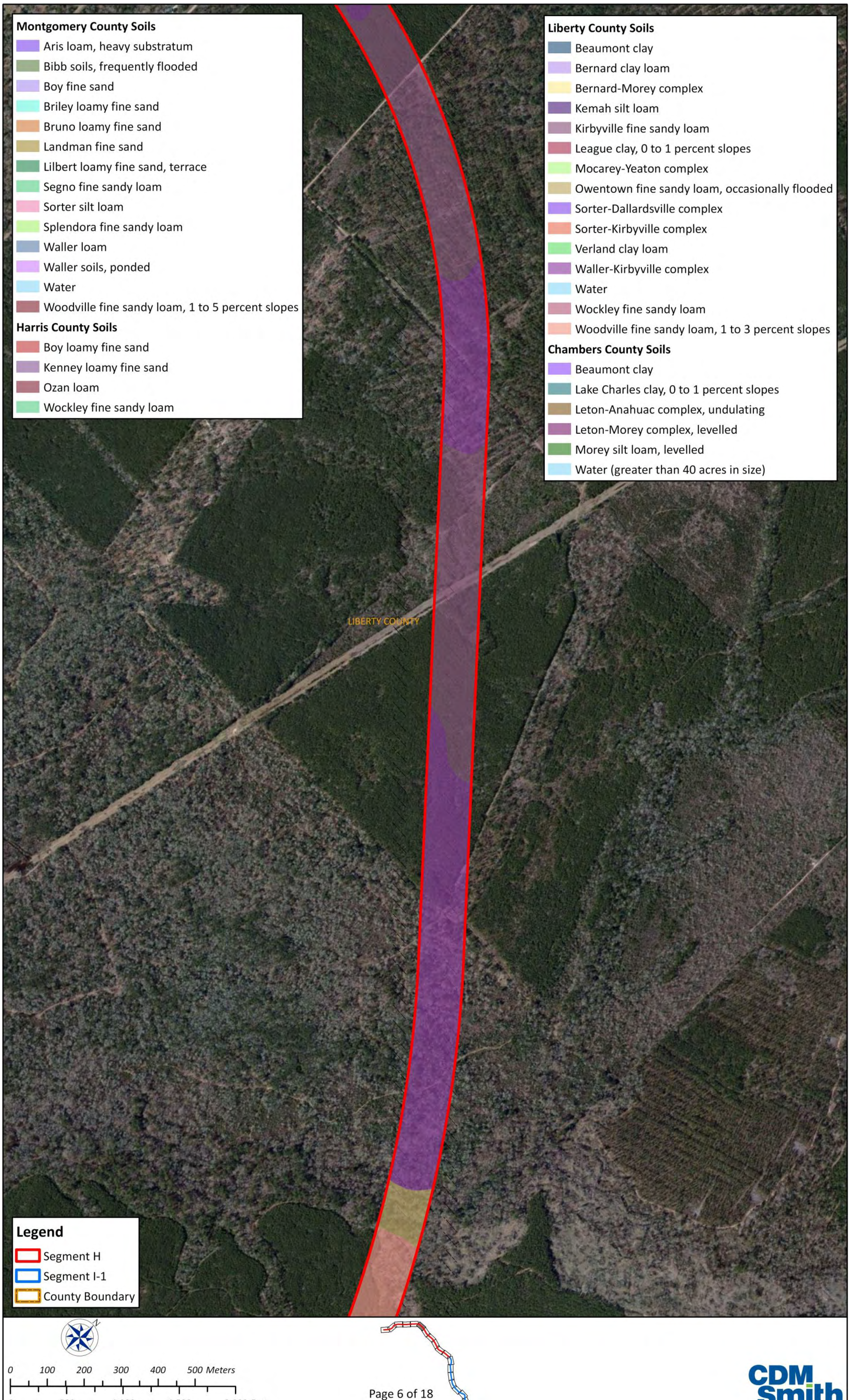


Figure 2-9. Soils within the APE, Page 6 of 18.

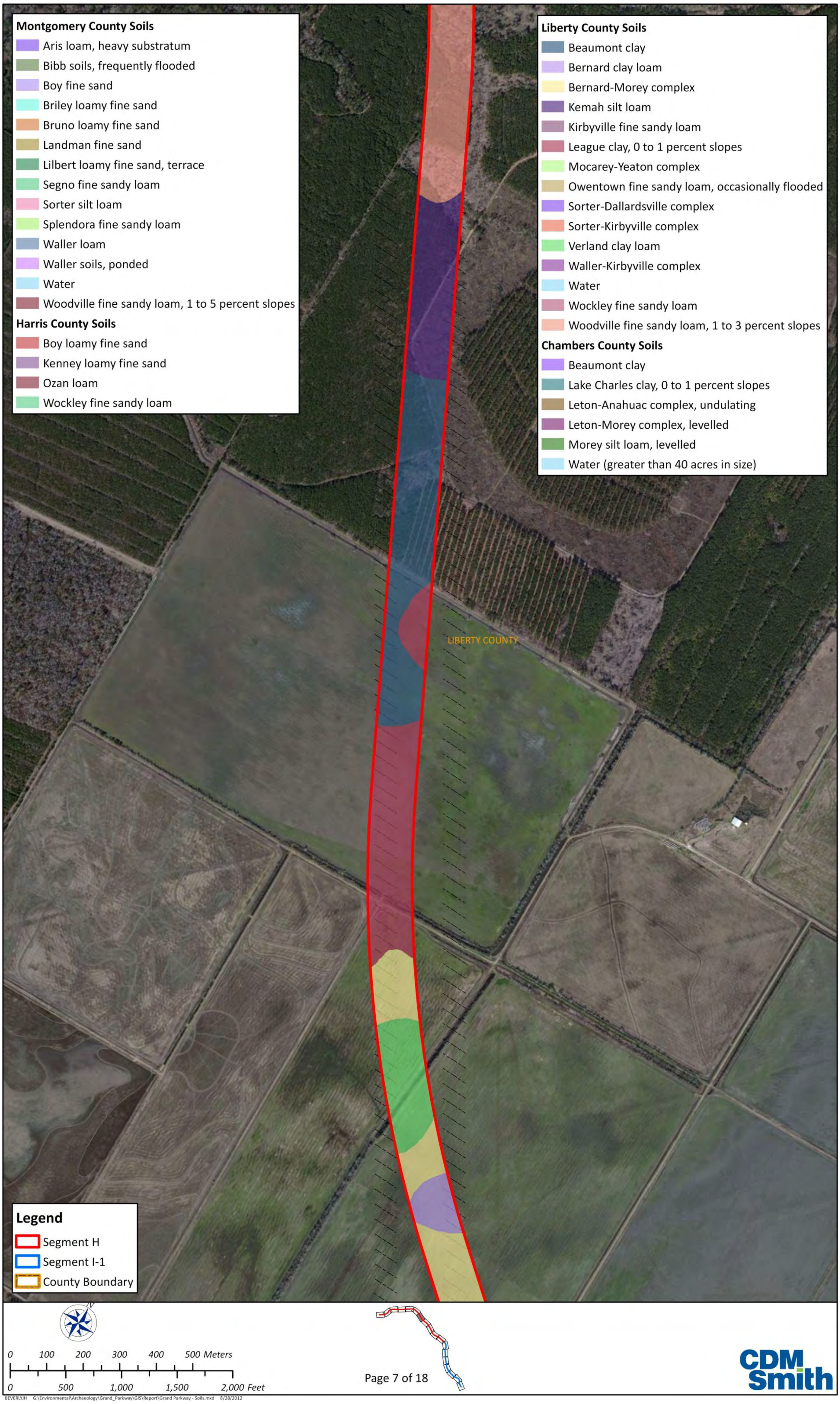


Figure 2-10. Soils within the APE, Page 7 of 18.

Figure 2-11. Soils within the APE, Page 8 of 18.

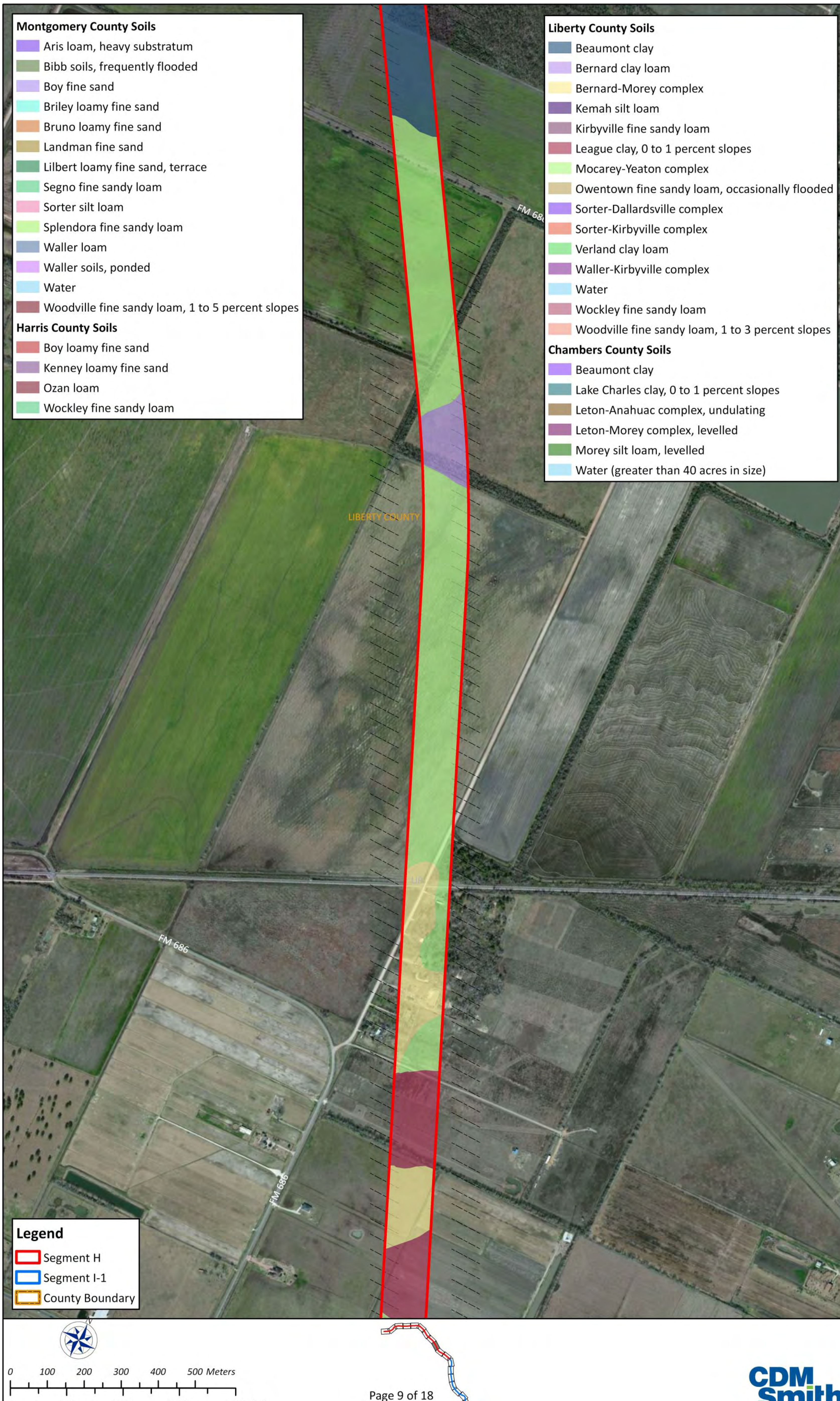


Figure 2-12. Soils within the APE, Page 9 of 18.

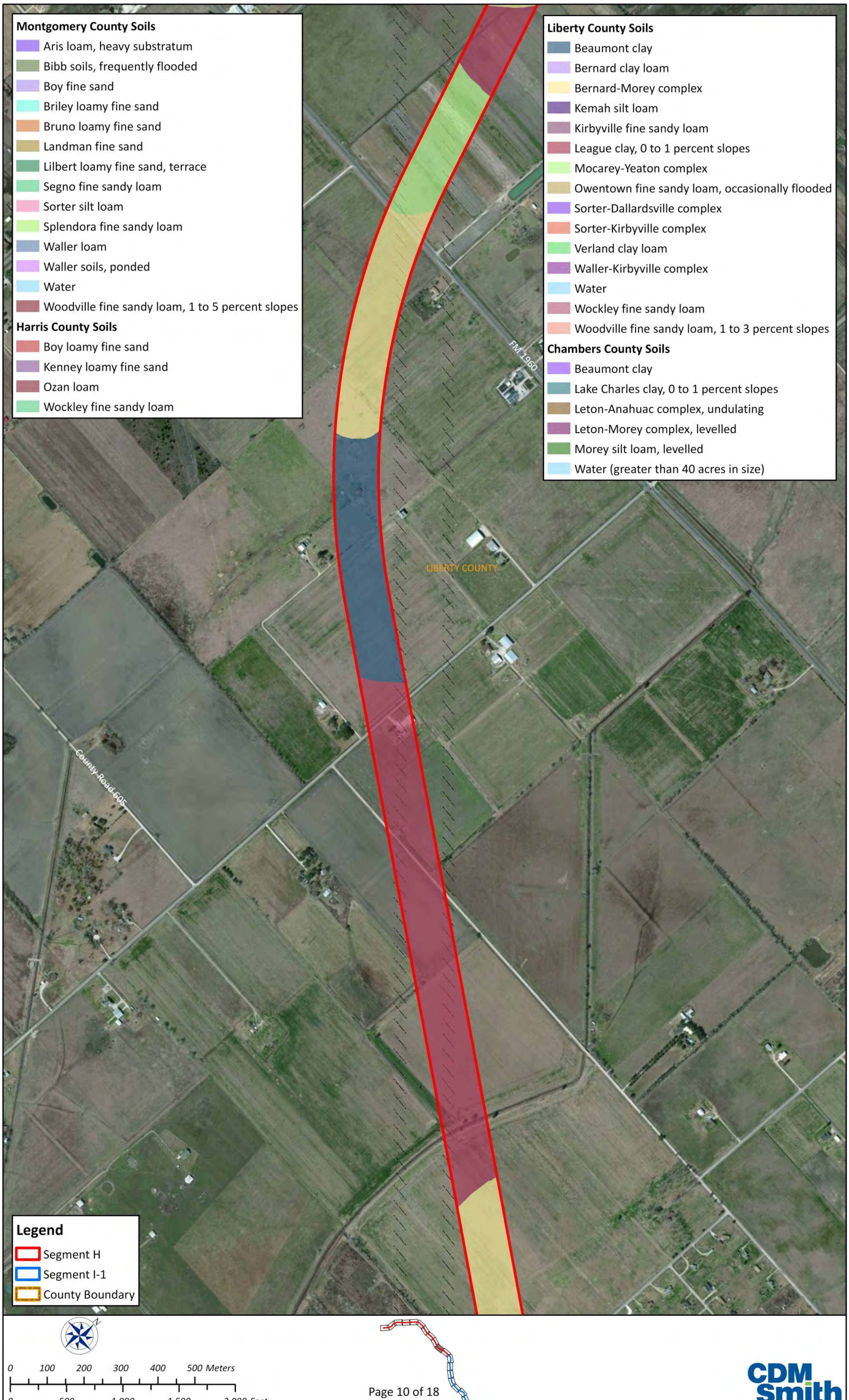


Figure 2-13. Soils within the APE, Page 10 of 18.

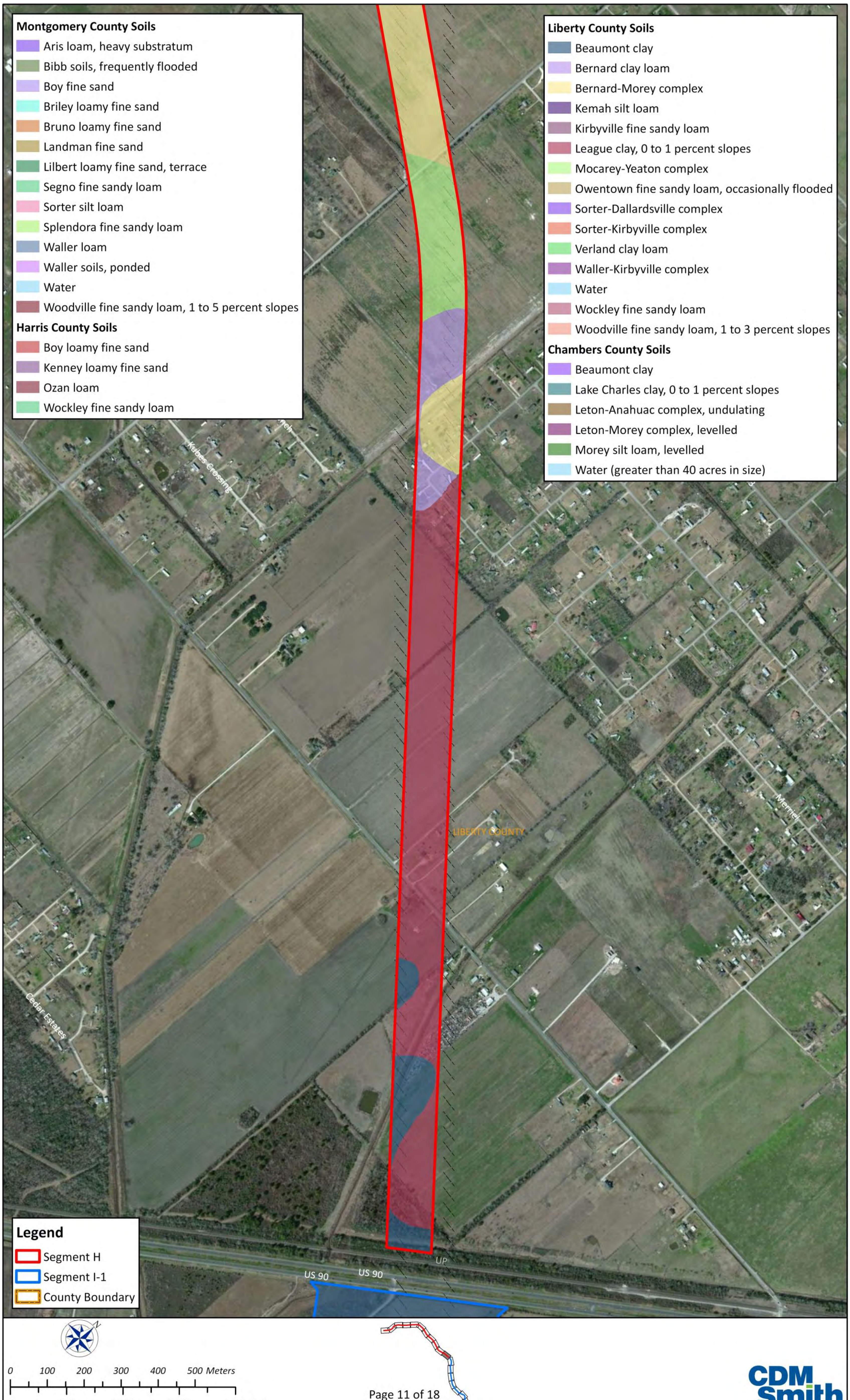


Figure 2-14. Soils within the APE, Page 11 of 18.

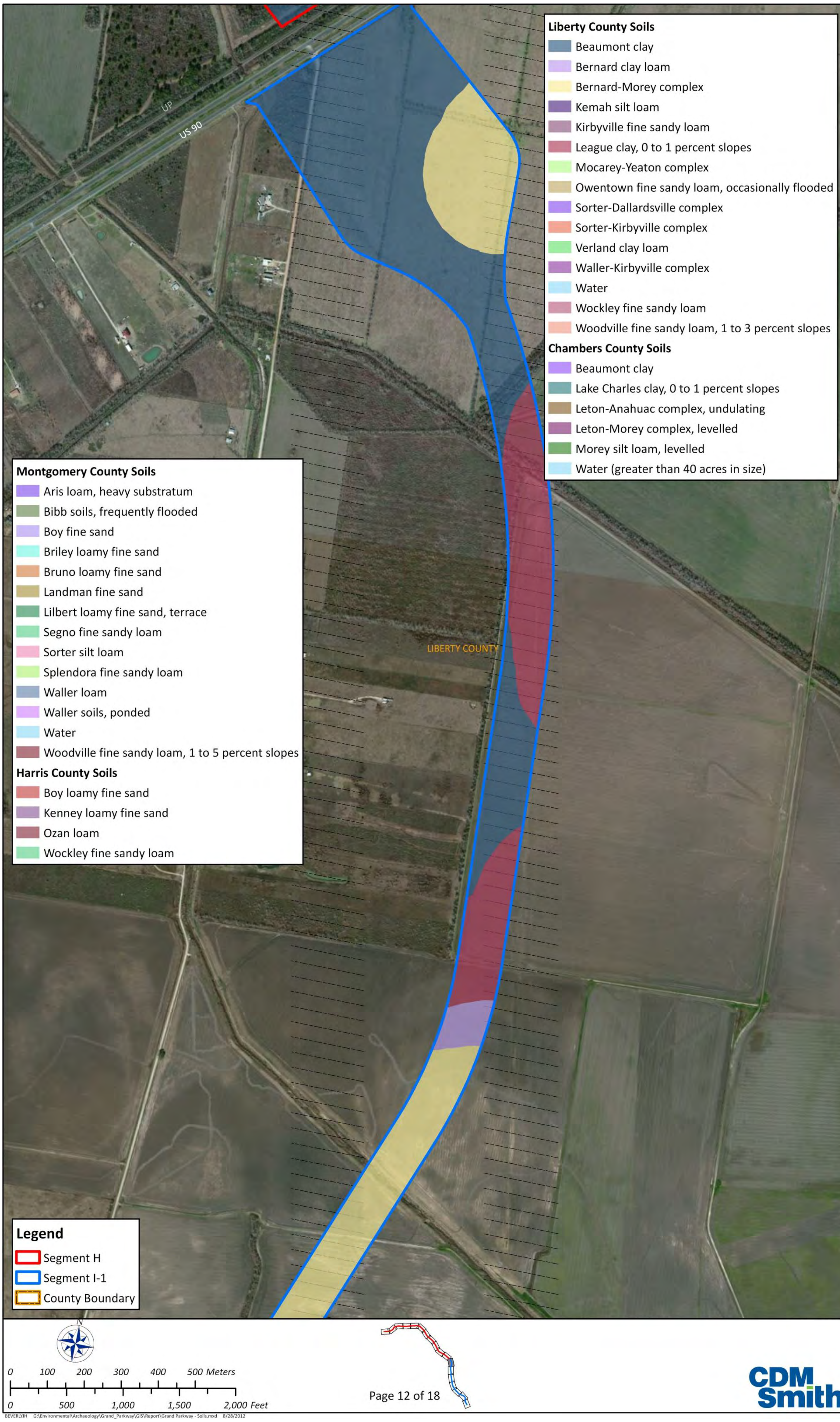


Figure 2-15. Soils within the APE, Page 12 of 18.

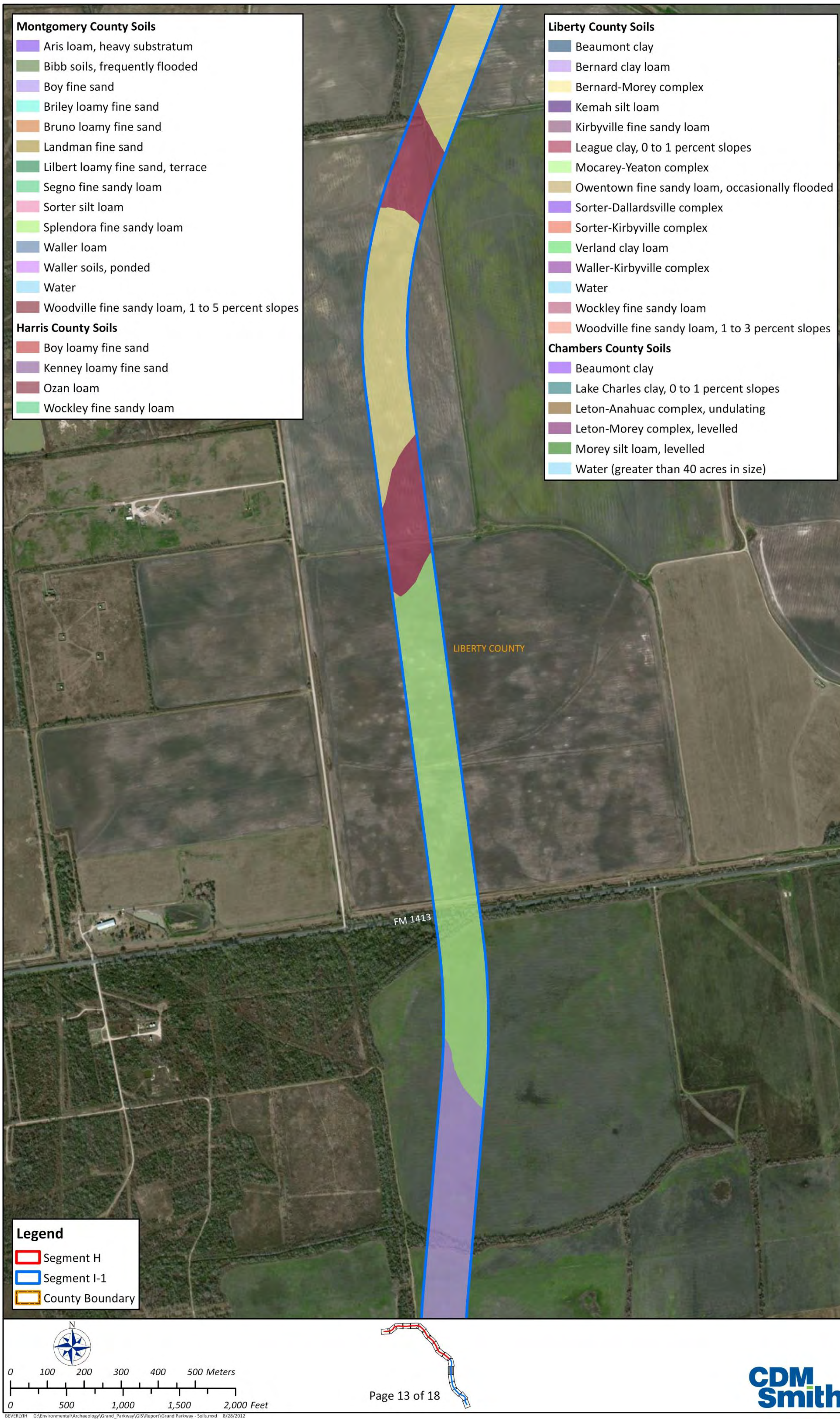


Figure 2-16. Soils within the APE, Page 13 of 18.

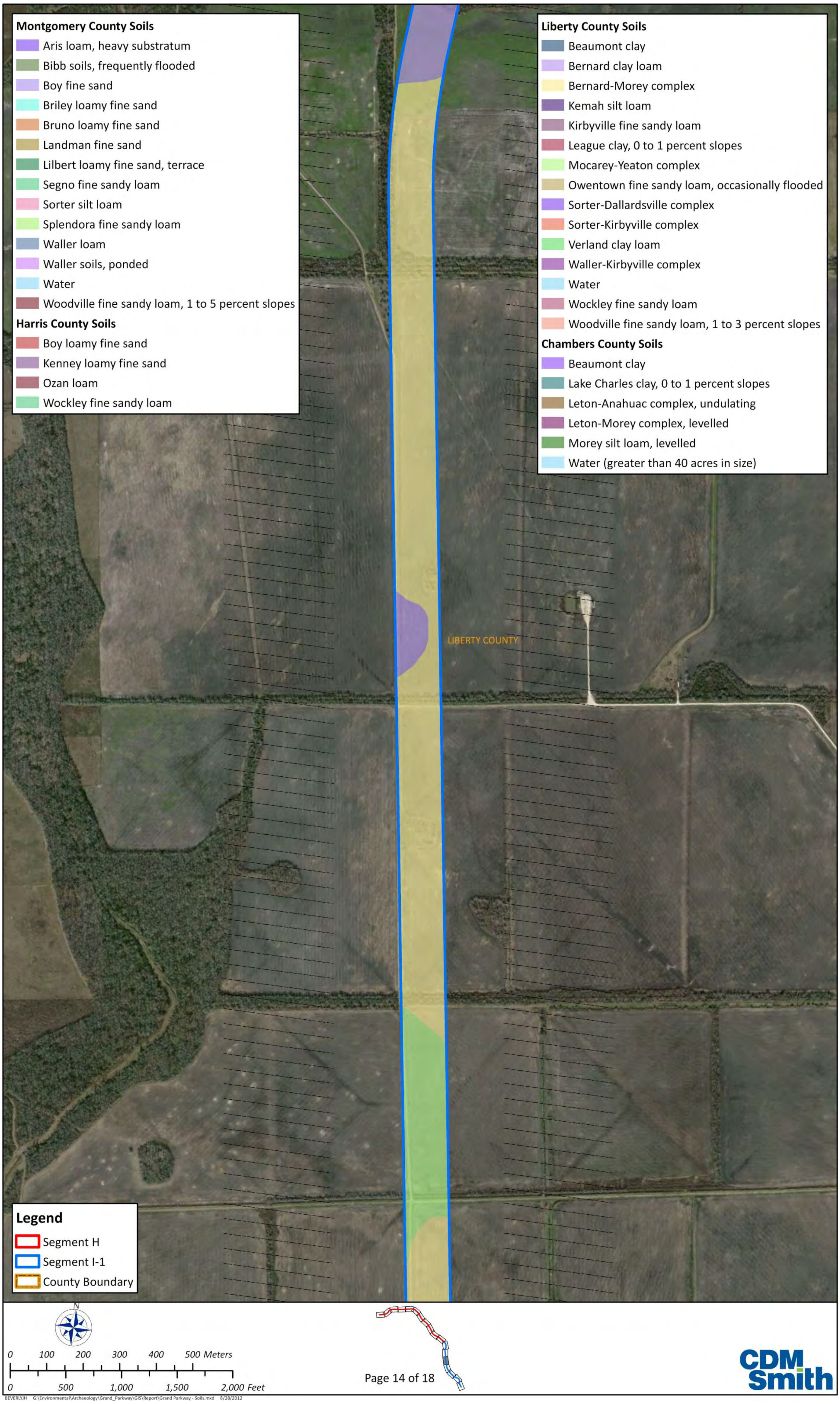


Figure 2-17. Soils within the APE, Page 14 of 18.

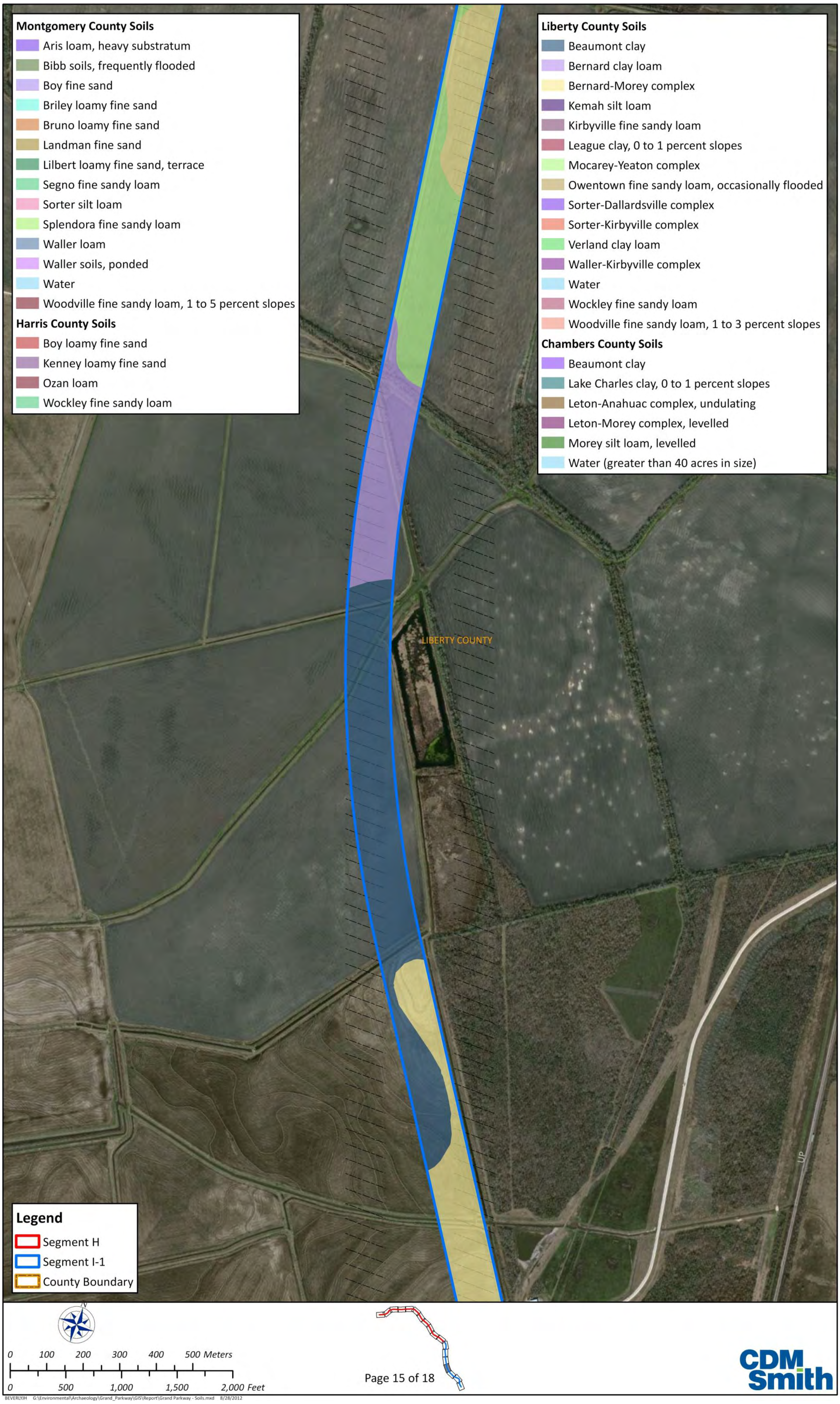


Figure 2-18. Soils within the APE, Page 15 of 18.

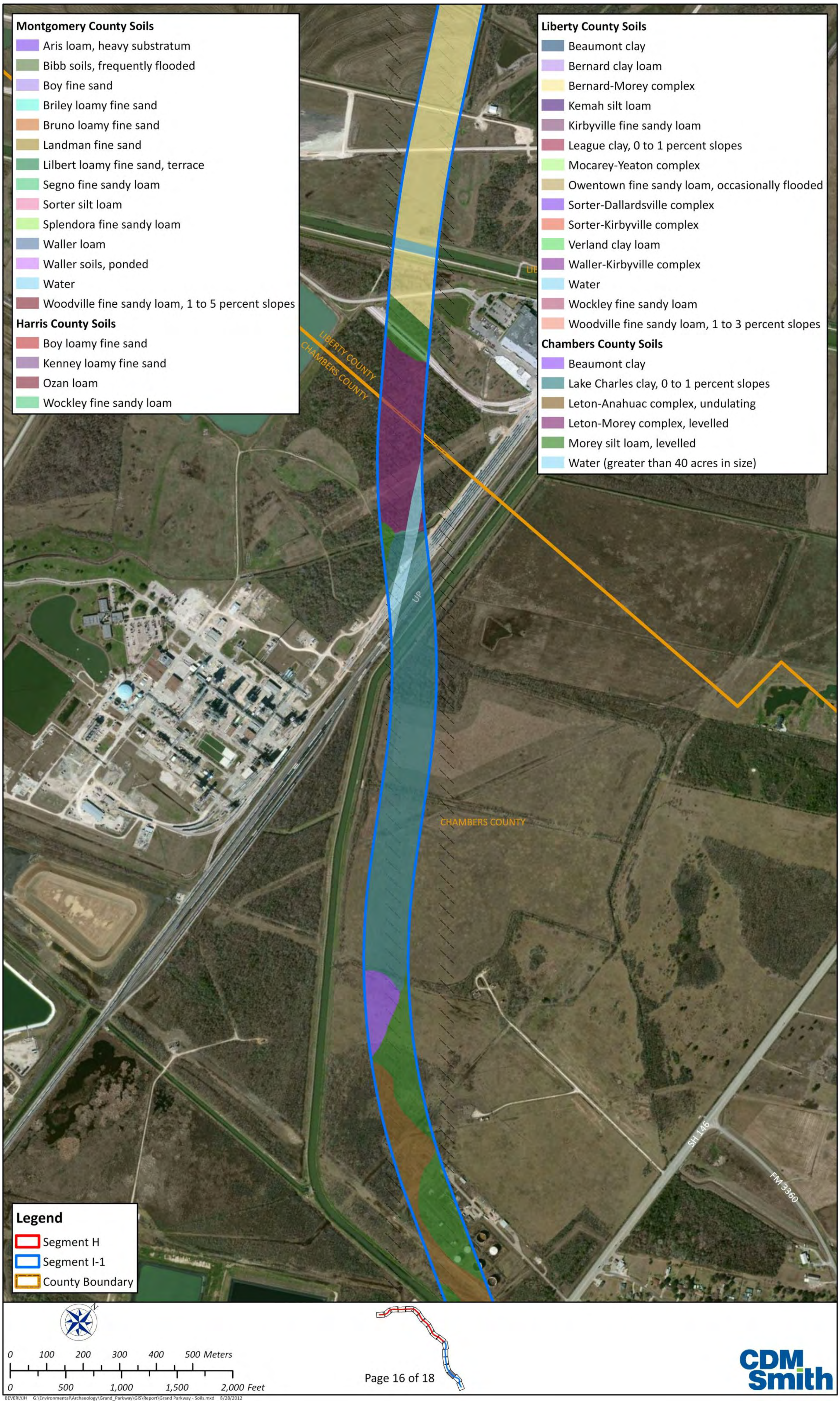


Figure 2-19. Soils within the APE, Page 16 of 18.

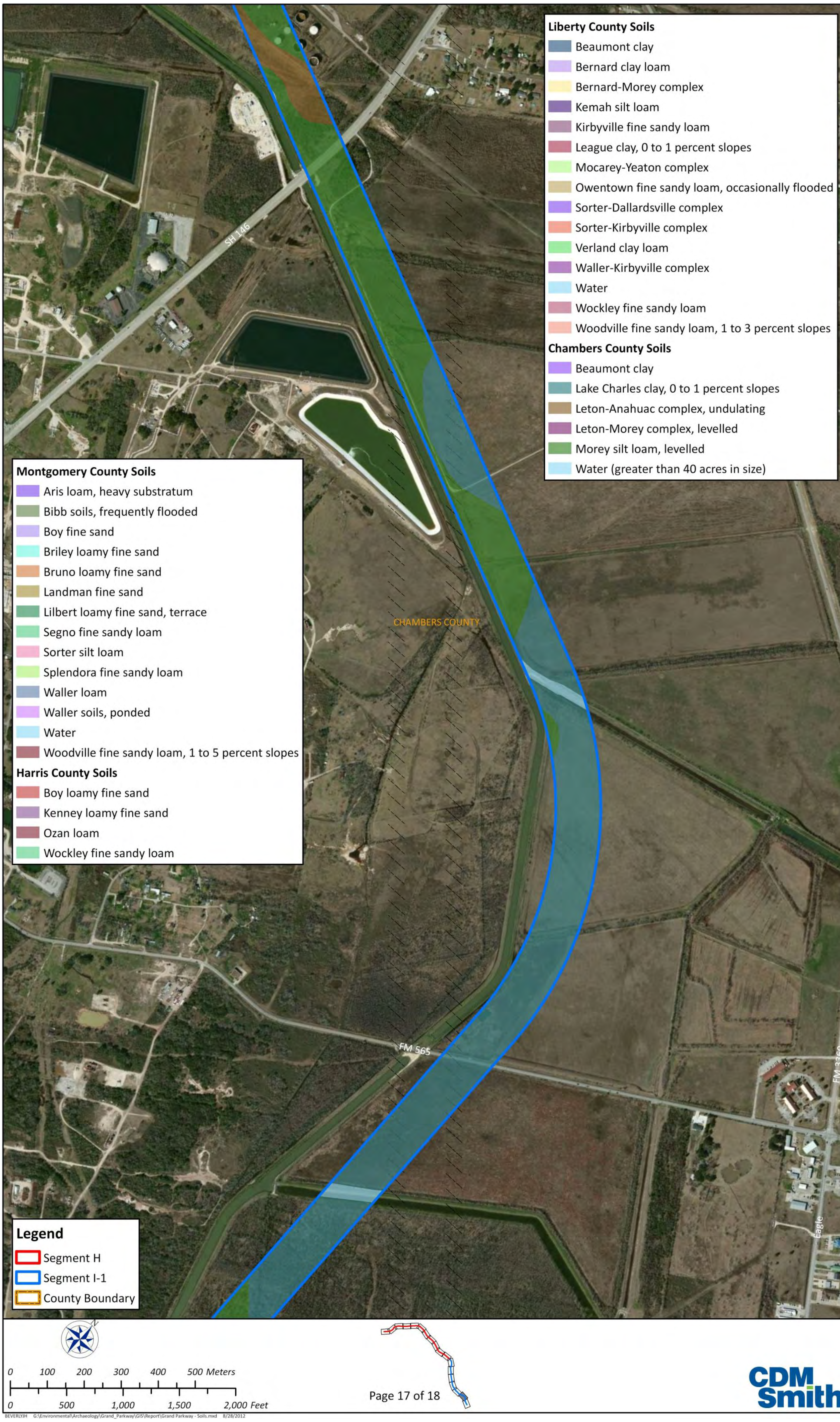


Figure 2-20. Soils within the APE, Page 17 of 18.

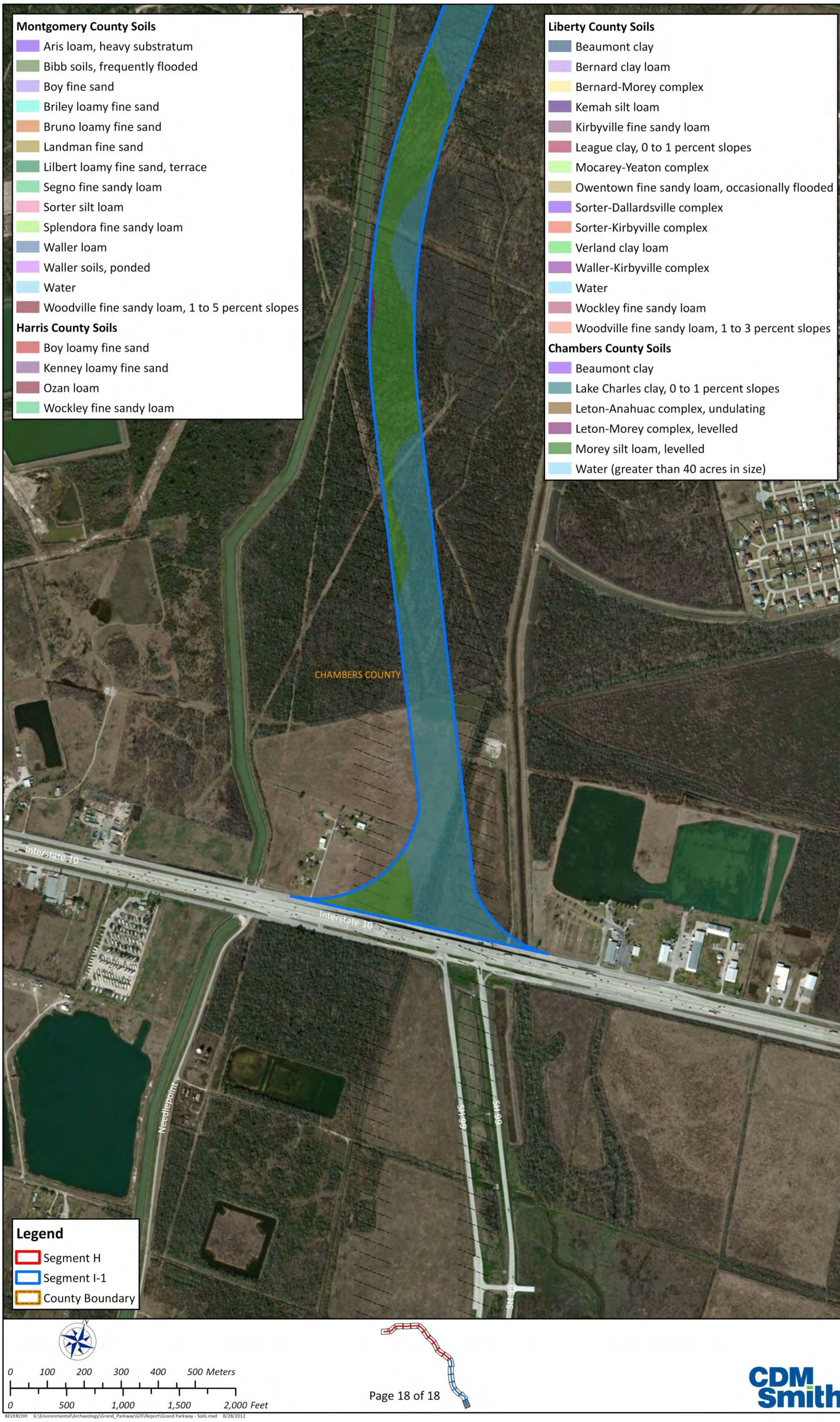


Figure 2-21. Soils within the APE, Page 18 of 18.

January, February, March, April, and December. Organic matter content in the surface horizon is about 1 percent. Non-irrigated land capability classification is 5w. This soil does not meet hydric criteria (USDA 2012).

Libert loamy fine sand, terrace (Ft) is made up of one major component. The Lilbert component makes up 100 percent of the map unit. Slopes are 1 to 2 percent. This component is on interfluves on coastal plains. The parent material consists of loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. Non-irrigated land capability classification is 3s. This soil does not meet hydric criteria (USDA 2012).

Briley loamy find sand (Lu) is made up of one major component. The Briley component makes up 100 percent of the map unit. Slopes are 1 to 3 percent. This component is on interfluves on coastal plains. The parent material consists of loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. Non-irrigated land capability classification is 3s. This soil does not meet hydric criteria (USDA 2012).

Segno fine sandy loam (Se) is made up of one major component. The Segno component makes up 100 percent of the map unit. Slopes are 0 to 2 percent. This component is on low hills on coastal plains. The parent material consists of loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 30 inches during January, February, March, April, and December. Organic matter content in the surface horizon is about 2 percent. Non-irrigated land capability classification is 2e. This soil does not meet hydric criteria (USDA 2012).

Sorter silt loam (So) is made up of one major component, Sorter (90%), and an unnamed, minor component (10%). The Sorter component makes up 90 percent of the map unit. Slopes are 0 to 1 percent. This component is on flats on coastal plains. The parent material consists of loamy Non-irrigated deposits of Early Pleistocene age. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is high. Shrink-swell potential is low. This soil is occasionally flooded. It is frequently ponded. A seasonal zone of water saturation is at 0 inches during January, February, March, April, May, October, November, and December. Organic matter content in the surface horizon is about 1 percent. Non-irrigated land capability classification is 4w. This soil meets hydric criteria. The soil has a slightly sodic horizon within 30 inches of the soil surface (USDA 2012).

Splendora fine sandy loam (Sp) is made up of one major component, Splendora (90%), and one minor component, Sorter (10%). The Splendora component makes up 90 percent of the map unit. Slopes are 0 to 1 percent. This component is on hills on coastal plains. The parent material consists of loamy fluviomarine deposits of Early Pleistocene age. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 15 inches during January, February, March, April, May, and December. Organic matter content in the surface horizon is about 1 percent. Non-irrigated land capability classification is 2w. This soil does not meet hydric criteria (USDA 2012).

Woodville fine sandy loam, 1 to 5 percent slopes (SuC) is made up of one major component. The Woodville component makes up 100 percent of the map unit. Slopes are 1 to 5 percent. This component is on interfluves on coastal plains. The parent material consists of clayey marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches is high. Shrinkswell potential is high. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. Non-irrigated land capability classification is 4e. This soil does not meet hydric criteria (USDA 2012).

Aris loam, heavy substratum (Tk) is made up of one major component, Aris (90%), and an unnamed, minor component (10%). The Aris component makes up 90 percent of the map unit. Slopes are 0 to 1 percent. This component is on flats on coastal plains. The parent material consists of loamy fluviomarine deposits of Late Pleistocene age. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches is moderate. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 12 inches during January, February, March, November, and December. Organic matter content in the surface horizon is about 1 percent. Non-irrigated land capability classification is 4w. Irrigated land capability classification is 4w. This soil meets hydric criteria. The soil has a slightly sodic horizon within 30 inches of the soil surface (USDA 2012).

Waller loam (Wa) is made up of one major component, Waller (98%), and an unnamed, minor component (2%). The Waller component makes up 98 percent of the map unit. Slopes are 0 to 1 percent. This component is on flats on coastal plains. The parent material consists of loamy fluviomarine deposits of Early Pleistocene age. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is high. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 15 inches during January, February, March, April, May, June, November, and December. Organic matter content in the surface horizon is about 1 percent. Non-irrigated land capability classification is 4w. Irrigated land capability classification is 4w. This soil meets hydric criteria (USDA 2012).

Waller soils, ponded (We), is made up of one major component, Waller (98%), and an unnamed, minor component (2%). The Waller component makes up 98 percent of the map unit. Slopes are 0 to 1 percent. This component is on flats on coastal plains. The parent material consists of loamy fluviomarine deposits of Early Pleistocene age. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is high. Shrink-swell potential is low. This soil is not flooded. It is frequently ponded. A seasonal zone of water saturation is at 0 inches during January, February, March, April, May, June, November, and December. Organic matter content in the surface horizon is about 1 percent. Non-irrigated land capability classification is 6w. This soil meets hydric criteria (USDA 2012).

2.4.2 Harris County Soils

Dominant soil associations included in the study area within Harris County include the Lake Charles-Bernard association, the Midland-Beaumont association, the Wockley-Gessner Association, the Aldine-Ozan association, and the Segno-Hockley association. The Lake Charles-Bernard association consists of somewhat poorly drained, very slowly permeable, clayey and loamy soils. The Midland-Beaumont association consists of poorly drained, very slowly permeable, loamy and clayey soils. The Wockley-Gessner association consists of somewhat poorly drained and poorly drained, very slowly permeable soils. The Aldine-Ozan association consists of somewhat poorly drained and poorly drained, very slowly permeable and slowly permeable soils. The Segno-Hockley association consists of moderate well drained, moderately slowly permeable soils.

Boy loamy fine sand (Bo) is made up of one major component, Boy (85%), and an unnamed, minor component (15%). The Boy component makes up 85 percent of the map unit. Slopes are 0 to 2 percent. This component is on terraces on river valleys on coastal plains. The parent material consists of sandy alluvium of Quaternary age. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 54 inches during January, February, November, and December. Organic matter content in the surface horizon is about 1 percent. Non-irrigated land capability classification is 3s. This soil does not meet hydric criteria (USDA 2012).

Kenney loamy fine sand (Kn) is made up of one major component, Kenney (85%), and an unnamed, minor component (15%). The Kenney component makes up 85 percent of the map unit. Slopes are 0 to 3 percent. This component is on terraces on river valleys on coastal plains. The parent material consists of loamy alluvium of Quaternary age. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. Non-irrigated land capability classification is 3s. This soil does not meet hydric criteria (USDA 2012).

Ozan loam (Oa) is made up of one major component, Ozan (90%), and an unnamed, minor component (10%). The Ozan component makes up 90 percent of the map unit. Slopes are 0 to 1 percent. This component is on flood plains on river valleys on coastal plains. The parent material consists of loamy alluvium of Late Pleistocene age. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is high. Shrink-swell potential is low. This soil is occasionally flooded. It is not ponded. A seasonal zone of water saturation is at 12 inches during January, February, March, April, May, and December. Organic matter content in the surface horizon is about 2 percent. Non-irrigated land capability classification is 4w. This soil meets hydric criteria (USDA 2012).

Wockley fine sandy loam (Wo) is made up of one major component, Wockley (85%), and an unnamed, hydric minor component (15%). The Wockley component makes up 85 percent of the map unit. Slopes are 0 to 1 percent. This component is on low hills on coastal plains. The parent material consists of loamy fluviomarine deposits of late Pliocene to early Pleistocene age. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is high. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 15 inches during January, February, November, and December. Organic matter content in the surface horizon is about 1 percent. Non-irrigated land capability classification is 3w. Irrigated land capability classification is 3w. This soil does not meet hydric criteria (USDA 2012).

2.4.3 Liberty County Soils

Dominant soil associations included in the APE within Liberty County include the Beaumont-Lake Charles association, Bernard-Morey-Morey association, Vamont-Woodville-Aldine association, and the Kirby-Waller-Sorter association. The Beaumont-Lake Charles association consists of nearly level to gently sloping, somewhat poorly drained and poorly drained, very slowly permeable, clayey soils. The Bernard Morey-Morey association consists of nearly level, somewhat poorly drained, very slowly permeable and slowly permeable, loamy soils. The Vamont-Woodville-Aldine association consists of nearly level, to moderately sloping, somewhat poorly drained, very slowly permeable, clayey and loamy soils. The Kirby-Waller-Sorter association consists of nearly level, somewhat poorly drained and poorly drained, moderately permeable and slowly permeable, loamy soils.

Beaumont clay (Ba) is made up of one major component, Beaumont (90%), and four minor components: League (5%), Bernard (2%), Bevil (2%), and Verland (1%). The Beaumont component makes up 90 percent of the map unit. Slopes are 0 to 1 percent. This component is on gilgai on depressions on flats on coastal plains. The parent material consists of clayey fluviomarine deposits of Late Pleistocene age. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches is high. Shrink-swell potential is very high. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 6 inches during January, February, March, November, and December. Organic matter content in the surface horizon is about 2 percent. Non-irrigated land capability classification is 4w. Irrigated land capability classification is 4w. This soil meets hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 3 percent. The soil has a slightly sodic horizon within 30 inches of the soil surface (USDA 2012).

Bernard clay loam (Be) is made up of one major component, Bernard (80%), and five minor components: Beaumont (5%), Aris (5%), League (5%), Mocarey (5%), Yeaton (5%), and Yeaton (5%). The Bernard component makes up 80 percent of the map unit. Slopes are 0 to 1 percent. This component is on meander scrolls on coastal plains. The parent material consists of loamy fluviomarine deposits of Late Pleistocene age. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches is high. Shrink-swell potential is high. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 12 inches during January, February, and December. Organic matter content in the surface horizon is about 4 percent. Non-irrigated land capability classification is 2w. Irrigated land capability classification is 2w. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 3 percent (USDA 2012).

Bernard-Morey complex is made up of two major components, Bernard (55%) and Morey (25%), and four minor components: Aris (5%), League (5%), Mocarey (5%), Yeaton (5%). The Bernard component makes up 55 percent of the map unit. Slopes are 0 to 1 percent. This component is on meander scrolls on coastal plains. The parent material consists of loamy fluviomarine deposits of Late

Pleistocene age. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches is high. Shrink-swell potential is high. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 12 inches during January, February, and December. Organic matter content in the surface horizon is about 4 percent. Non-irrigated land capability classification is 2w. Irrigated land capability classification is 2w. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 13 percent. The Morey component makes up 25 percent of the map unit. Slopes are 0 to 1 percent. This component is on meander scrolls on coastal plains. The parent material consists of loamy fluviomarine deposits of Late Pleistocene age. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is very high. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 24 inches during January, February, and December. Organic matter content in the surface horizon is about 2 percent. Non-irrigated land capability classification is 3w. Irrigated land capability classification is 3w. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 3 percent (USDA 2012).

Kemah silt loam (Kh) is made up of one major component, Kemah (85%), and two minor components, Aldine (10%), and Aris, depressional (5%). The Kemah component makes up 85 percent of the map unit. Slopes are 0 to 1 percent. This component is on meander scrolls on coastal plains. The parent material consists of loamy fluviomarine deposits of Late Pleistocene age. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches is high. Shrink-swell potential is high. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 12 inches during January, February, March, November, and December. Organic matter content in the surface horizon is about 2 percent. Irrigated land capability classification is 3w. This soil does not meet hydric criteria (USDA 2012).

Kirbyville fine sandy loam (Kr) is made up of one major component and four minor components: Dallardsville (5%), Otanya (5%), Sorter (5%), and Waller (5%). The Kirbyville component makes up 80 percent of the map unit. Slopes are 0 to 1 percent. This component is on flats on coastal plains. The parent material consists of loamy fluviomarine deposits of Early Pleistocene age. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is high. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 24 inches during January, February, and March. Organic matter content in the surface horizon is about 1 percent. Non-irrigated land capability classification is 2w. This soil does not meet hydric criteria (USDA 2012).

League Clay, 0 to 1 percent slopes (LaA) is made up of one major component, (League 90%), and six minor components: Beaumont (3%), Bevil (2%), Verland (2%), Bernard (1%), Mocarey (1%), and Morey (1%). The League component makes up 90 percent of the map unit. Slopes are 0 to 1 percent. This component is on gilgai on flats on coastal plains. The parent material consists of clayey fluviomarine deposits of Late Pleistocene age. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches is moderate. Shrink-swell potential is very high. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 9 inches during January, February, and March. Organic matter content in the surface horizon is about 3 percent. Non-irrigated land capability classification is 3w. Irrigated land capability classification is 3w. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 1 percent. The soil has a slightly sodic horizon within 30 inches of the soil surface (USDA 2012).

Mocarey-Yeaton (My) complex is made up of two major components Mocarey (65%) and Yeaton (15%), and four minor components: Aris (5%), Bernard (5%), Kemah (5%), and Morey (5%). The Mocarey component makes up 65 percent of the map unit. Slopes are 0 to 1 percent. This component is on meander scrolls on coastal plains. The parent material consists of loamy fluviomarine deposits of Late Pleistocene age. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is high. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 21 inches during Custom Soil Resource Report 55 January, February, March, April, November, and December. Organic matter content in the surface horizon is about 2 percent. Non-irrigated land capability classification is 3w. Irrigated land capability classification is 3w. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 33 percent. The Yeaton component makes up 15 percent of the map unit. Slopes are 0 to 1 percent. This component is on pimple mounds on flats on coastal plains. The parent material consists of loamy eolian deposits over clayey fluviomarine deposits of Late Pleistocene age. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is high. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 15 inches during January, February, and December. Organic matter content in the surface horizon is about 2 percent. Non-irrigated land capability classification is 2w. Irrigated land capability classification is 2w. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 23 percent. The soil has a slightly sodic horizon within 30 inches of the soil surface (USDA 2012).

Owentown fine sandy loam, occasionally flooded (Oz) is made up of one major component (Owentown 80%), and two minor components, Mantachie (10%) and Voss (10%). The Owentown component makes up 80 percent of the map unit. Slopes are 0 to 1 percent. This component is on flood plains on coastal plains. The parent material consists of loamy alluvium of Holocene age. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is occasionally flooded. It is not ponded. A seasonal zone of water saturation is at 39 inches during January, February, March, April, May, June, October, November, and December. Organic matter content in the surface horizon is about 1 percent. Non-irrigated land capability classification is 2w. This soil does not meet hydric criteria (USDA 2012).

Sorter-Dallardsville (Sd) is made up of two major complexes, Sorter (55%) and Dallardsville (30%), and two minor complexes Kirbyville (10%) and Otanya (5%). The Sorter component makes up 55 percent of the map unit. Slopes are 0 to 1 percent. This component is on flats on coastal plains. The parent material consists of loamy fluviomarine deposits of Early Pleistocene age. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is high. Shrink-swell potential is low. This soil is not flooded. It is occasionally ponded. A seasonal zone of water saturation is at 0 inches during January, February, March, April, May, October, November, and

December. Organic matter content in the surface horizon is about 1 percent. Non-irrigated land capability classification is 4w. This soil meets hydric criteria. The soil has a slightly sodic horizon within 30 inches of the soil surface. The Dallardsville component makes up 30 percent of the map unit. Slopes are 0 to 1 percent. This component is on pimple mounds on flats on coastal plains. The parent material consists of loamy eolian deposits over loamy fluviomarine deposits of Pleistocene age. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is moderate. Shrinkswell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 18 inches during January, February, March, April, and December. Organic matter content in the surface horizon is about 1 percent. Non-irrigated land capability classification is 2w. This soil does not meet hydric criteria (USDA 2012).

Verland clay loam (Ve) is made up of one major complex, Verland (95%), and two minor complexes, Aldine (3%) and Vamont (2%). The Verland component makes up 95 percent of the map unit. Slopes are 0 to 1 percent. This component is on meander scrolls on coastal plains. The parent material consists of loamy fluviomarine deposits of Late Pleistocene age. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches is high. Shrink-swell potential is high. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 6 inches during January, February, March, April, November, and December. Organic matter content in the surface horizon is about 2 percent. Irrigated land capability classification is 4w. This soil meets hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 2 percent (USDA 2012).

Waller-Kirbyville (Wk) is made up of two major components, Waller (50%) and Kirbyville (35%), and two minor components, Dallardsville (8%) and Otanya (7%). The Waller component makes up 50 percent of the map unit. Slopes are 0 to 1 percent. This component is on flats on coastal plains. The parent material consists of loamy fluviomarine deposits of Early Pleistocene age. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is high. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 15 inches during January, February, March, April, May, June, November, and December. Organic matter content in the surface horizon is about 1 percent. Non-irrigated land capability classification is 4w. Irrigated land capability classification is 4w. This soil meets hydric criteria. The Kirbyville component makes up 35 percent of the map unit. Slopes are 0 to 1 percent. This component is on flats on coastal plains. The parent material consists of loamy fluviomarine deposits of Early Pleistocene age. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is high. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 24 inches during January, February, and March. Organic matter content in the surface horizon is about 1 percent. Non-irrigated land capability classification is 2w. This soil does not meet hydric criteria (USDA 2012).

Wockley fine sandy loam (Wo) is made up of one major component, Wockley (80%), and five minor components: Dallardsville (4%), Hockley (4%), Segno (4%), Splendora (4%), and Waller (4%). The Wockley component makes up 80 percent of the map unit. Slopes are 0 to 1 percent. This component is on low hills on coastal plains. The parent material consists of loamy fluviomarine deposits of late Pliocene to early Pleistocene age. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is high. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 15 inches during January, February, November, and December. Organic matter content in the surface horizon is about 1 percent. Irrigated land capability classification is 3w. This soil does not meet hydric criteria (USDA 2012).

Woodville fine sandy loam, 1 to 3 percent slopes (WvB) is made up of one major complex, Woodville (85%), and two minor components, Dylan (8%) and Vamont (7%). The Woodville component makes up 85 percent of the map unit. Slopes are 1 to 3 percent. This component is on interfluves on coastal plains. The parent material consists of clayey residuum weathered from sandstone and shale. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches is high. Shrink-swell potential is high. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. Non-irrigated land capability classification is 3e. This soil does not meet hydric criteria (USDA 2012).

2.4.4 Chambers County Soils

Dominant soil associations included in the APE within Chambers County include the Beaumont Morey-Lake Charles association, the Anahuac-Morey-Frost association and the Valden Acadia Calhoun association. The APE is near the Wallisville Reservoir, but not within the reservoir boundary. The Beaumont-Morey-Lake Charles association consists of acid to neutral, clayey and loamy soils. The Anahuac-Morey-Frost association consists of acid loamy soils, and the Valden-Acadia-Calhoun association is acid, clayey and loamy soils.

Beaumont clay (Be) is made up of one major component, Beaumont (95%), and an unnamed, minor component (5%). The Beaumont component makes up 95 percent of the map unit. Slopes are 0 to 1 percent. This component is on gilgai on depressions on flats on coastal plains. The parent material consists of clayey fluviomarine deposits of Late Pleistocene age. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches is moderate. Shrink-swell potential is very high. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 6 inches during January, February, March, November, and December. Organic matter content in the surface horizon is about 2 percent. Non-irrigated land capability classification is 4w. Irrigated land capability classification is 4w. This soil meets hydric criteria. The soil has a slightly sodic horizon within 30 inches of the soil surface (USDA 2012).

Leton-Anahuac complex, undulating, is made up of two major complexes, Leton (60%) and Anahuac (30%), and an unnamed, minor component (10%). The Leton component makes up 60 percent of the map unit. Slopes are 0 to 1 percent. This component is on open depressions on flats on coastal plains. The parent material consists of loamy fluviomarine deposits of Late Pleistocene age. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is high. Shrink-swell potential is moderate. This soil is occasionally flooded. It is not ponded. A seasonal zone of water saturation is at 9 inches during January, February, March, April, May, October, November, and December. Organic matter content in the surface horizon is about 2 percent. Non-irrigated land capability classification is 4w. This soil meets hydric criteria. The Anahuac component makes up 30 percent of the map unit. Slopes are 0 to 2 percent. This component is on meander scrolls on coastal plains. The parent material consists of loamy fluviomarine deposits of Late Pleistocene age. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches is high. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 24 inches during January, February, March, April, May, October, November, and December. Organic matter content in the surface horizon is about 2 percent. Non-irrigated land capability classification is 3w. Irrigated land capability classification is 3w. This soil does not meet hydric criteria. The soil has a slightly sodic horizon within 30 inches of the soil surface (USDA 2012).

Leton-Morey complex, leveled (Fs) is made up of two major complexes, Leton (55%) and Morey (35%), and an unnamed, minor component. The Leton component makes up 55 percent of the map unit. Slopes are 0 to 1 percent. This component is on open depressions on flats on coastal plains. The parent material consists of loamy fluviomarine deposits of Late Pleistocene age. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is high. Shrink-swell potential is moderate. This soil is occasionally flooded. It is not ponded. A seasonal zone of water saturation is at 9 inches during January, February, March, April, May, October, November, and December. Organic matter content in the surface horizon is about 2 percent. Non-irrigated land capability classification is 4w. This soil meets hydric criteria. The Morey component makes up 35 percent of the map unit. Slopes are 0 to 1 percent. This component is on meander scrolls on coastal plains. The parent material consists of loamy fluviomarine deposits of Late Pleistocene age. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is very high. Shrink-swell potential is high. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 24 inches during January, February, and December. Organic matter content in the surface horizon is about 2 percent. Non-irrigated land capability classification is 3w. Irrigated land capability classification Custom Soil Resource Report 30is 3w. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 3 percent (USDA 2012).

Lake Charles clay, 0 to 1 percent slopes (LaA) is made up of one major component, and two minor components, Beaumont (10%), and an unnamed, minor component (5%). The Lake Charles component makes up 85 percent of the map unit. Slopes are 0 to 1 percent. This component is on gilgai on flats on coastal plains. The parent material consists of clayey fluviomarine deposits of Late Pleistocene age. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches is high. Shrink-swell potential is very high. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 4 percent. Non-irrigated land capability classification is 2w. Irrigated land capability classification is 2w. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 3 percent. The soil has a slightly sodic horizon within 30 inches of the soil surface (USDA 2012).

Morey silt loam, leveled (Mo) is made up of one major component, Morey (85%), and two minor components, Beaumont (10%), and an unnamed, minor component (5%). The Morey component makes up 85 percent of the map unit. Slopes are 0 to 1 percent. This component is on meander scrolls on coastal plains. The parent material consists of loamy fluviomarine deposits of Late Pleistocene age.

Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is very high. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 24 inches during January, February, and December. Organic matter content in the surface horizon is about 2 percent. Non-irrigated land capability classification is 3w. Irrigated land capability classification is 3w. This soil does not meet hydric criteria (USDA 2012).

2.5 Drainage

The APE area streams generally flow in a southeast direction and includes the north eastern portion of Lake Houston, Caney and Peach Creeks, the East Fork San Jacinto River, Luce Bayou, Cedar Bayou, and several drainage and irrigation canals (Figure 2-22).There are three drainage basins that envelop the study area: the San Jacinto River Basin, the Galveston Bay-Sabine Lake Basin, and the Lower Trinity River Basin (Figure 2-22).The individual watersheds for Segments H and I-1 are described in a north-to-south direction, the general direction of flow. Many minor tributaries feed all major streams in the study area.

2.5.1 San Jacinto River Basin

White Oak Creek is a sub-watershed of the Caney Creek. Its drainage area is 29.5 mi^2 and it contributes a 100-yr peak discharge of over 4,000 cubic feet per second (cfs) to the flow of Caney Creek and subsequently the East Fork San Jacinto River. White Oak Creek has nearly 7 mi of stream reach. The floodplain is 2,000 ft wide at US 59 (N) and narrows to 900 ft wide approximately 2 mi downstream. At the Harris County line, the floodplain is 4,000 ft wide and indistinguishable from that of Caney Creek. Although the entire watersheds of the East Fork San Jacinto River, as well as those of Peach and Caney Creeks are mostly undeveloped, there is substantial subdivision development within the White Oak Creek watershed.

The Peach Creek watershed area is 151 mi^2, encompassing land from its confluence with Caney Creek in Montgomery County north 57 mi to SH 150 in Walker County. The creek enters the area of the APE 2,500 ft north of US 59 (N) at the southern limits of the City of Splendora and flows south over 6 mi to the confluence with Caney Creek. The Peach Creek floodplain at the City of Splendora is 2,200 ft wide with a base flood evaluation (BFE) of 100 ft and a channel centerline water depth of approximately 15 ft. As the creek traverses south, it passes through the small towns of Patton Village, Woodbranch, and Roman Forest and crosses FM 1485. Floodplain widths vary from 1,800 ft at US 59 (N) to over 5,000 ft at the Caney Creek junction, which is approximately 4,000 ft north of the Harris County line. At the Caney Creek confluence, the Peach Creek BFE is 71 ft; the 100-yr flow is approximately 44,000 cfs with a velocity slightly exceeding 2.0 feet per second (fps). The flood stage water depth is approximately 25 ft. The Peach Creek watershed is primarily undeveloped.

The Caney Creek watershed encompasses 222 mi^2 from its confluence with the East Fork San Jacinto River in Harris County, north through Montgomery County to SH 150 in Walker County, the watershed. The reach length is also 57 mi long, of which approximately 7 mi lies within the vicinity of the APE. The creek enters the area of the APE approximately 2,500 ft northwest of US 59 (N) where the floodplain is approximately 1,500 ft wide. The BFE is 84 ft with a 100-yr peak flow around 27,000 cfs, which creates a velocity of slightly over 3.0 fps. The centerline floodwater depth would be nearly 24 ft. Caney Creek crosses FM 1485 approximately 2 mi downstream and establishes its confluence with Peach Creek approximately 3 mi further. The 100-yr floodplain varies from approximately 3,000

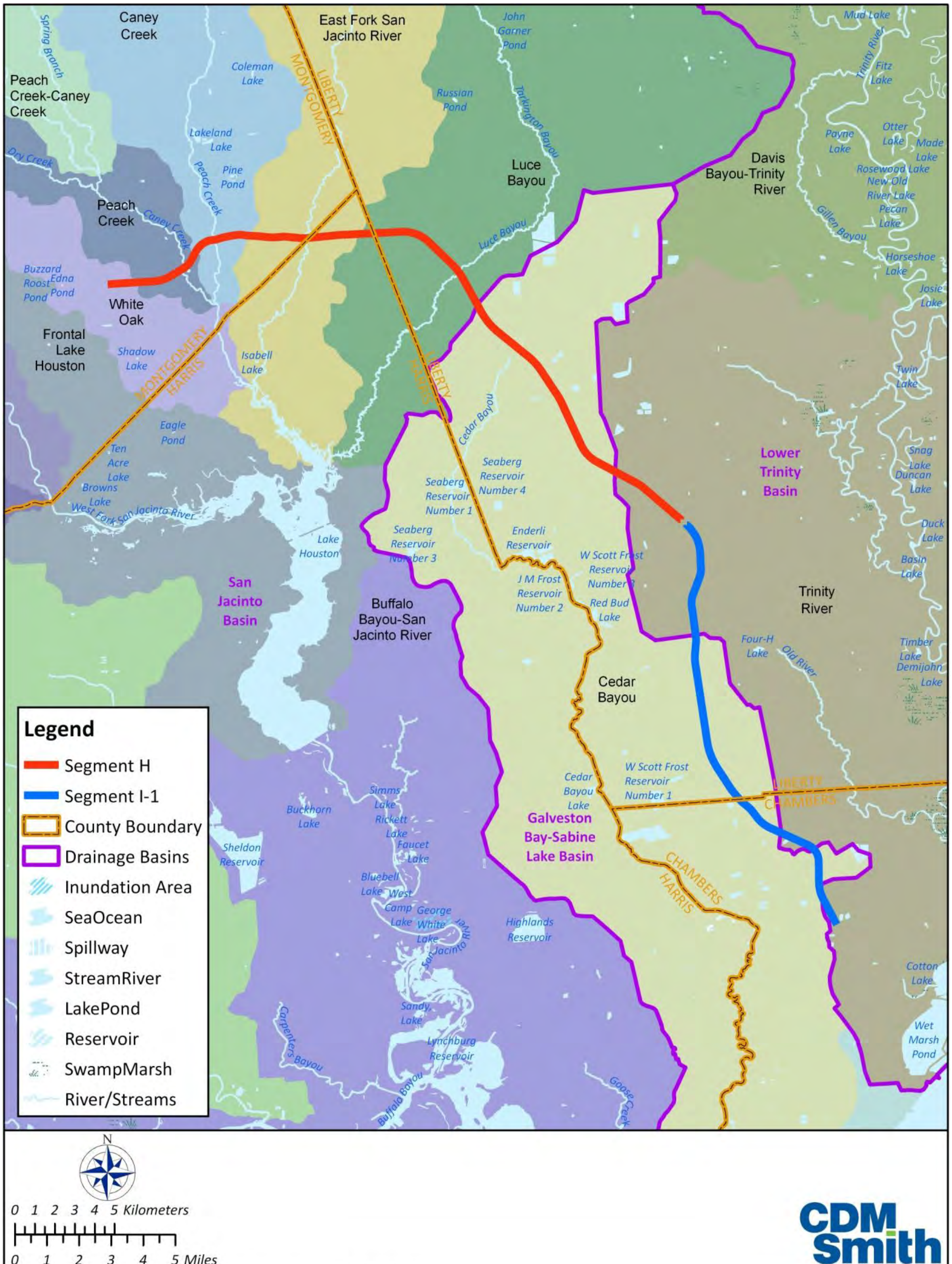


Figure 2-22. Drainage in the Vicinity of the APE.

ft wide near FM 1485 to approximately 1 mi wide at the Peach Creek junction. At the junction, the BFE is approximately 71 ft; the 100-yr peak discharge is 66,000 cfs with a velocity of approximately 2.5 fps. The main channel flood stage would be nearly 23 ft deep. The confluence of Caney Creek and White Oak Creek is approximately 1.5 mi south of the Harris County line. During a 100-yr flood event, this junction would experience backwater effects from the East Fork San Jacinto River, which has confluence with Caney Creek 4,400 ft farther downstream. At the White Oak Creek confluence, the BFE is 58.0 ft. The floodplain is 2,800 ft wide with a 100-yr peak discharge of approximately 66,000 cfs. The corresponding velocity would be near 3.0 fps. At the confluence of Caney Creek and the East Fork San Jacinto River, the BFE is 57.0 ft and the floodplain is 1 mi wide. The Caney Creek watershed is also largely undeveloped and the major land use category is forest.

Luce Bayou is located 3 mi north of Dayton in west central Liberty County and flows from the northeast to the southwest as it transects the northeastern portion of the APE. The watershed contains an area of approximately 227 mi^2. Approximately 14 mi of the bayou's reach is within the area of the APE. The watershed is primarily flat terrain with local escarpments and surface sandy loam soil, in places, that supports heavy forests and agriculture. Roughness values indicate the bayou channel is irregular with the cross-section alternating frequently and displaying heavy vegetation. The floodplain is most often heavily wooded and exhibits tall grasses. Storm water runoff is slow and there are long duration flood concentrations. Flow is intermittent in the upper reaches and very sluggish elsewhere. The watershed is largely non-urbanized.

Luce Bayou enters the area of the APE 1,000 ft upstream of SH 321 where the BFE is 97.5 ft and the floodplain is 7,500 ft wide. The 100-yr peak discharge is approximately 4,000 cfs with a velocity of 0.5 fps. The centerline water depth, relative to the BFE, is approximately 13 ft. The Luce Bayou confluence with Tarkington Bayou is 4 mi downstream. At this juncture, the floodplain is approximately 3,000 ft wide. The 100-yr flow is 16,900 cfs with a velocity of less than 2.0 fps. Backwater effects from Tarkington Bayou extend nearly 3 mi up Luce Bayou which is indicative of the flat channel, floodplain, and watershed. The floodplain narrows to 1,000 ft wide in places downstream. Nine miles beyond Tarkington Bayou where Luce Bayou enters Harris County, the floodplain is 2,200 ft wide. Three miles farther, the floodplain narrows to 1,700 ft at FM 2100. Approximately 7.3 mi downstream of the county line, Luce Bayou meets the East Fork San Jacinto River among subdivision development. The 100-yr peak discharge at this point is approximately 16,100 cfs, and the BFE is 50.5 ft with a floodplain width of 6,000 ft. The 100-yr flood stage is 34.0 ft with a velocity of 1.0 fps.

2.5.2 Galveston Bay-Sabine Lake Basin

Cedar Bayou is the primary water body in the transitional Trinity-San Jacinto Coastal Basin. The 247-mi^2 watershed is characterized by level terrain that slopes gently to the south. Headwaters of the bayou are found in Liberty County 7.5 mi northeast of the FM 1960 intersection with the Liberty County/Harris County line. The channel forms most of the boundary between Harris, Liberty, and Chambers counties, with approximately half of the watershed in Harris County. Flooding is frequent with extended periods of storm water concentrations. Based on roughness values, the bayou channel has a fairly high degree of irregularity with the cross-section alternating frequently and often covered with heavy vegetation. Floodplain widths vary dramatically from 1,000 ft to 14,000 ft. The Harris County Flood Control District (HCFCD) maintains at least 14 channels near the APE that discharge into Cedar Bayou. Much of the watershed is undeveloped with the exception of Mont Belvieu and the City of Baytown.

At the upstream end of Cedar Bayou, the 100-yr flow is approximately 900 cfs. Downstream 5.2 mi at the Liberty County/Harris County line, the 100-yr peak discharge is 4,400 cfs with an average velocity of less than 2.0 fps. The floodplain is 2,000 ft wide with a BFE of 71 ft and a centerline floodwater depth of 16 ft. Cedar Bayou intersects FM 1960 approximately 2,000 ft downstream where the floodplain widens to 14,000 ft, primarily on the west side of the channel. The channel grade line and associated floodplain flatten near FM 1960 with flood stage channel velocities generally less than 2.0 fps downstream. At the US 90 intersection, 7.8 mi downstream, the BFE is 57 ft; the 100-yr flow is approximately 7,200 cfs and the floodplain is 4,500 ft wide. The flood stage water depth is 17 ft. Four-and-a-half miles farther, at the confluence with Adlong Ditch, Cedar Bayou has a peak flow over 8,000 cfs with a floodplain width of approximately 10,000 ft. Harris, Liberty, and Chambers counties intersect approximately 2.3 mi downstream where the floodplain is 6,000 ft wide and the BFE is 36 ft. One mile to south is the junction with Hickory Island Gully, a stream with a 6-mi reach, which contributes a peak discharge of 1,600 cfs to Cedar Bayou. Approximately 3.2 mi farther, Cedar Bayou passes FM 1942 where the floodplain narrows to 1,500 ft wide. The bayou exits the study area 3.6 mi downstream, approximately 1,500 ft south of IH 10. Flood stage water depth is over 30 ft at the channel centerline. The 100-yr peak flow is 17,000 cfs and the floodplain is 3,000 ft wide.

2.5.3 Lower Trinity River Basin

The terrain of the Lower Trinity River Basin slopes gently and has low relief. Ground cover is typical for the Coastal Province. Roughness values indicate heavy brush with forests in the floodplains. The soils are principally dark clays and sandy loams. The western edge of the Trinity River 100-yr floodplain is approximately 1 mi east of the intersection of US 90 and SH 146 where the BFE is 28.5 ft. The surrounding natural ground elevation is approximately 80 ft. Two branches of Linney Creek, a minor tributary of the Trinity River, are located approximately 2 mi north of Dayton.

2.6 Modern Climate

The Gulf of Mexico has an effect on the climate of the four counties containing the APE. Generally, the area is classified as humid subtropical with relative mild temperatures. Temperatures rarely reach below freezing and do not last long. The relative humidity increases nearer the gulf costal area.

2.6.1 Montgomery County Climate

Montgomery County is within the humid, subtropical belt that is found along the Gulf of Mexico. This belt influences much of the counties weather. Because of its location along the Gulf, Montgomery County has mild winters and hot and humid summers. In winter the average temperature is 63 degrees F and the average temperature during the summer is 94 degrees. Rain occurs throughout the year and snowfalls are rare (McClintock et al. 1972:81-82).

2.6.2 Harris County Climate

Harris County is located within the humid, subtropical belt that is found along the Gulf of Mexico. As a result, the county has mild winters and warm summers with abundant amount of rain throughout the year. Very few days of below freezing temperatures occur and most last only a few hours. Rainfall averages between 30 and 60 inches yearly with monthly rainfall ranging from between a trace to 17.64 inches (Wheeler 1976:2).

2.6.3 Liberty County Climate

In Liberty County the long summers are hot and humid. Winters are cool and are only occasionally interrupted by short periods of cold air from the north. Rainfall generally occurs throughout the year, although monthly amounts increase during winter and spring. The 15 year annual average precipitation in Liberty County is about 62 inches. The average relative humidity in mid-afternoon is about 60 percent (Griffith 1996).

2.6.4 Chambers County Climate

The climate of Chambers County has been described as humid subtropical with warm summers and mild winters. Summer days are warm and nights are cool. During the winter temperatures are mild with some nights reaching below freezing. Spring and fall are relative comfortable compared to the warm summer. Rainfall averages 51.55 inches annually (Crout 1976:49-50).

2.7 Prehistoric Climate

The paleoenvironment of the four counties was initially a varying Pleistocene-Holocene climate related to changing sea levels (Ricklis 1993, 2004). Initially, the Pleistocene environment was cool and moist followed by a drier Holocene (Bousman and Collins 1990). Seasonal shifts in temperature and precipitation occurred during the period but periods of extreme dry conditions were not common (Aten 1983). These changes correspond to the presence/absence of bison in the region (Dillehay 1974).

2.8 Flora

The major ecological regions within the APE are the Pineywoods and the Gulf Coastal Prairies and Marshes. The designated Texas Parks and Wildlife Department vegetation types within the APE are dominated by the pine hardwood forests in the north and crops found in the southern portion.

The typical vegetation species associated within the pine hardwood forest vegetation type include shortleaf pine (*Pinus echinata*), water oak (*Quercus nigra*), white oak (*Quercus alba*), southern red oak (*Quercus falcata*), winged elm (*Ulmus alata*), beech (*Fagus grandifolia*), blackgum (*Nyssa sylvatica*), magnolia (*Magnolia grandiflora*), American beautyberry (*Callicarpa americana*), American hornbeam (*Carpinus caroliniana*), flowering dogwood (*Cornus florida*), yaupon (*Ilex vomitoria*), hawthorn (Crateagus sp.), supplejack (*Berchemia scandens*), Virginia creeper (*Parthenocissus quinquefolia*), wax myrtle (*Myrica cerifera*), red bay (*Persea borbonia* var. borbonia), sassafras (*Sassafras albidum*), southern arrowwood (*Viburnum dentatum*), poison ivy (*Toxicodendron radicans*), greenbriar (*Smilax bona-nox*) and blackberry (Rubus sp.). The following species may be found within the APE along deep sand ridges: black hickory (*Carya texana*), sandjack oak (*Quercus incana*), common persimmon (*Diospyros virginiana*), sweetgum (*Liquidambar styraciflua*), beaked panicum (*Panicum anceps*), Indiangrass (*Sorghastrum nutans*), switchgrass (*Panicum virgatum*), three-awn (Aristida sp.) and, bushclover (Lespedeza sp.).

The Texas Parks and Wildlife Department maps indicate that the southern portion of the APE is designated as crops vegetation type. This vegetation type includes either cover crops or row crops including rice fields which provide food and/or fiber for man or domestic animals. Crops can also include grasslands associated with crop rotations.

2.9 Fauna

Agriculture has significantly impacted most of the APE. Cultivated fields producing a variety of crops for human consumption as well as domestic animals now dominate the landscape in the southern portion. With the removal or decline of native vegetation and human encroachment into habitats, the wildlife species composition and diversity also show a decline from the abundant communities that probably once existed throughout the Pineywoods and Gulf Coastal Prairies and Marshes regions of East Texas.

Agricultural fields that may seem to have very little wildlife, however, may support multiple species in the areas along fence rows and in the isolated pockets or fields that still exhibit native or fallow vegetation. Species may also utilize crop and fallow fields for feeding and temporary shelter. Rodent species like the fulvous harvest mouse (*Reithrodontomys fulvescens*) can be found in crop fields and fence rows within the APE. Some species, such as the northern pygmy mouse (*Baiomys taylori*), may have expanded their ranges using fence rows as travel corridors. Larger rodents like the hispid cotton rat (*Sigmodon hispidus*), the eastern cottontail (*Sylvilagus floridanus*), striped skunk (*Mephitis mephitis*), bobcat (*Felis rufus*), gray fox (*Urocyon cinereoargenteus*), and coyote (*Canus latrans*) may occasionally utilize the areas around agricultural fields. Many of these species, including the white-tailed deer (*Odocoileus virginianus*), are still present in parts of the APE. Avian species such as the chipping sparrow (*Spizella passerine*) and the lark sparrow (*Chondestes grammacus*) may utilize these farmland areas as permanent breeding residents and/or as wintering residents. The eastern meadowlark (*Sturnella magna*) is a permanent resident that may nest in hayfields or disturbed grasslands. Other avian species such as the broad-tailed hawk (*Buteo platypterus*), red-shouldered hawk (*Buteo lineatus*), red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), loggerheaded shrike (*Lanius ludovicianus*), and the barn owl (*Tyto alba*) can be found locally.

The Pineywoods natural region in the northern and western portion of the APE supports a number of species that are declining in population as the clearing of the forested areas reduces habitat availability. Some of the avian species that may be found in this area include Bachman's sparrow (*Aimophila aestivalis*), Swallow-tailed kite (*Elanoides forficatus*), red-cockaded woodpecker (*Picoides borealis*), and barred owl (*Strix varia*). Mammals that can be found in the Pineywoods natural region (forested) of East Texas include river otter (*Lutra canadensis*), swamp rabbit (*Sylvilagus aquaticus*), Rafinesque's big eared bat (*Corynorhinus rafinesquii*), southeastern myotis bat (*Myotis austroriparius*), and eastern spotted skunk (*Spilogale putorius*). Reptiles associated with the Pineywoods natural region of East Texas include timber rattlesnake (*Crotalus horridus*), Louisiana pine snake (*Pituophis ruthveni*), alligator snapping turtle (*Macrochelys temminckii*), and a variety of salamanders.

2.10 Land Use

Present land use for the APE was derived from the National Land Cover Database compiled in 2006 and based on the classification scheme developed by Huang et al. (2004). The land cover classification data was created by a combination of Landsat imagery and ancillary data. The combined image data is then generalized to a 1 acre minimum mapping unit. An algorithm is then used to compare the pixel data against known values resulting in a product that identifies land cover type for the pixel.

Fifteen types of land use classifications areas are identified within the APE. Table 2-1 summarizes the land use classification for each county and the classification scheme for the APE is shown in Figure 2-23 through Figure 2-40. Each of the classifications is described below.

Open Water is classified as areas of open water, generally with less than 25% cover or vegetation or soil. Developed, Open Space is classified as areas with a mixture of some constructed materials, but mostly vegetation in the form of lawn grasses. Impervious surfaces account for less than 20 percent of total cover. These areas most commonly include large-lot single-family housing units, parks, golf courses, and vegetation planted in developed settings for recreation, erosion control, or aesthetic purposes.

Table 2-1. Land Use Classification for the APE.

County	Land Classification	Acres	Hectares
Montgomery	Developed, High Intensity	2	1
	Developed, Low Intensity	78	32
	Developed, Medium Intensity	46	18
	Developed, Open Space	77	31
	Evergreen Forest	44	18
	Grassland/Herbaceous	12	5
	Mixed Forest	92	37
	Pasture/Hay	8	3
	Shrub/Scrub	25	10
	Woody Wetlands	52	21
Harris	Developed, Low Intensity	<1	<1
	Developed, Open Space	5	2
	Evergreen Forest	20	8
	Grassland/Herbaceous	6	3
	Mixed Forest	11	5
	Shrub/Scrub	4	2
	Woody Wetlands	51	21
Liberty	Barren Land (Rock/Sand/Clay)	4	2
	Cultivate Crops	387	157
	Deciduous Forest	14	5
	Developed, Low Intensity	3	1
	Developed, Open Space	22	9
	Emergent Herbaceous Wetlands	<1	<1
	Evergreen Forest	52	21
	Grassland/Herbaceous	30	12
	Mixed Forest	42	17
	Pasture/Hay	462	187
	Shrub/Scrub	96	39
	Woody Wetlands	64	26
Chambers	Barren Land (Rock/Sand/Clay)	1	1
	Deciduous Forest	16	6
	Developed, Low Intensity	8	3
	Developed, Medium Intensity	3	1
	Developed, Open Space	27	11
	Emergent Herbaceous Wetlands	3	1
	Evergreen Forest	<1	<1
	Grassland/Herbaceous	4	2
	Open Water	3	1
	Pasture/Hay	147	60
	Shrub/Scrub	1	<1
	Woody Wetlands	56	23

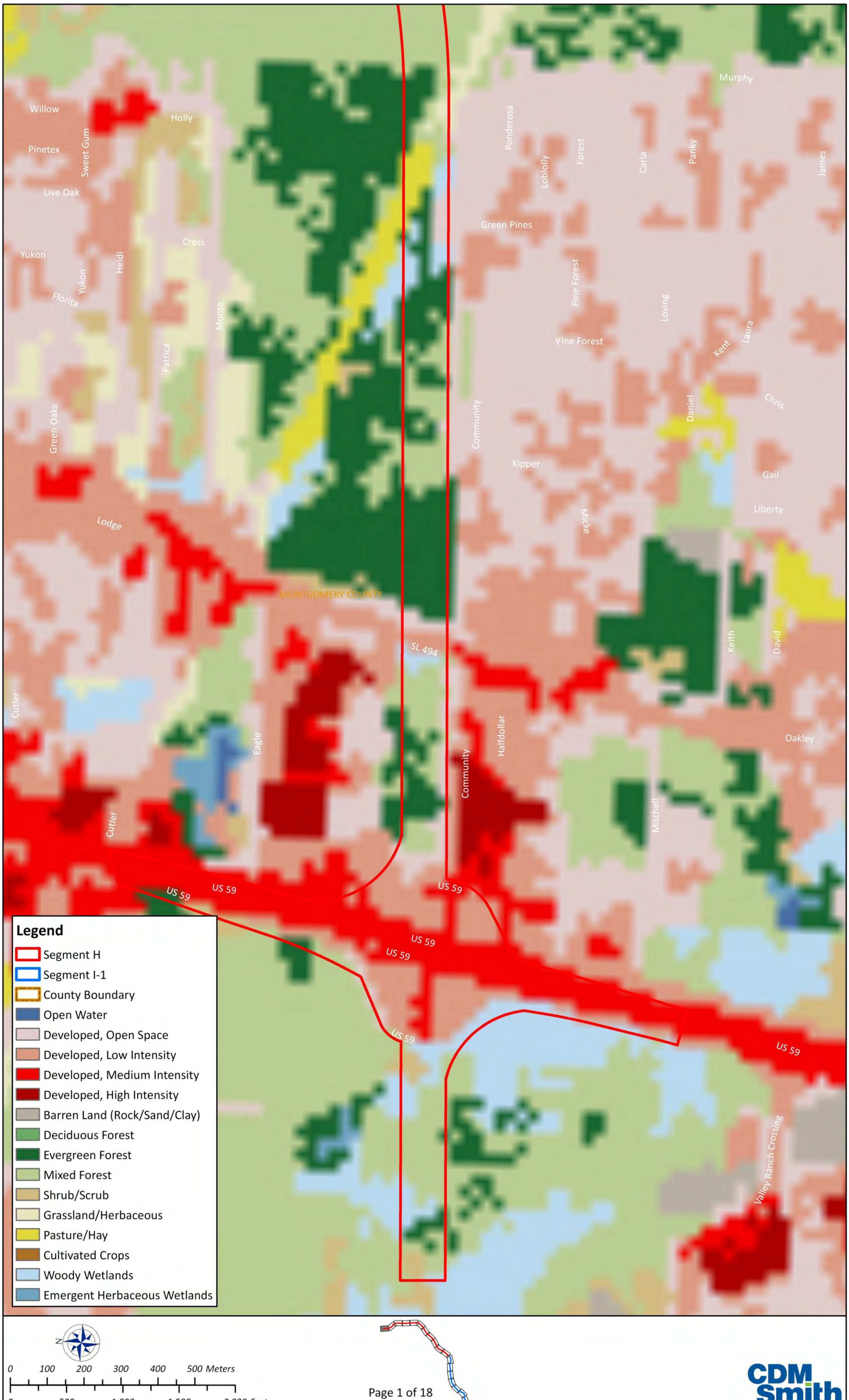


Figure 2-23. Land Use Classification within the APE, Page 1 of 18.

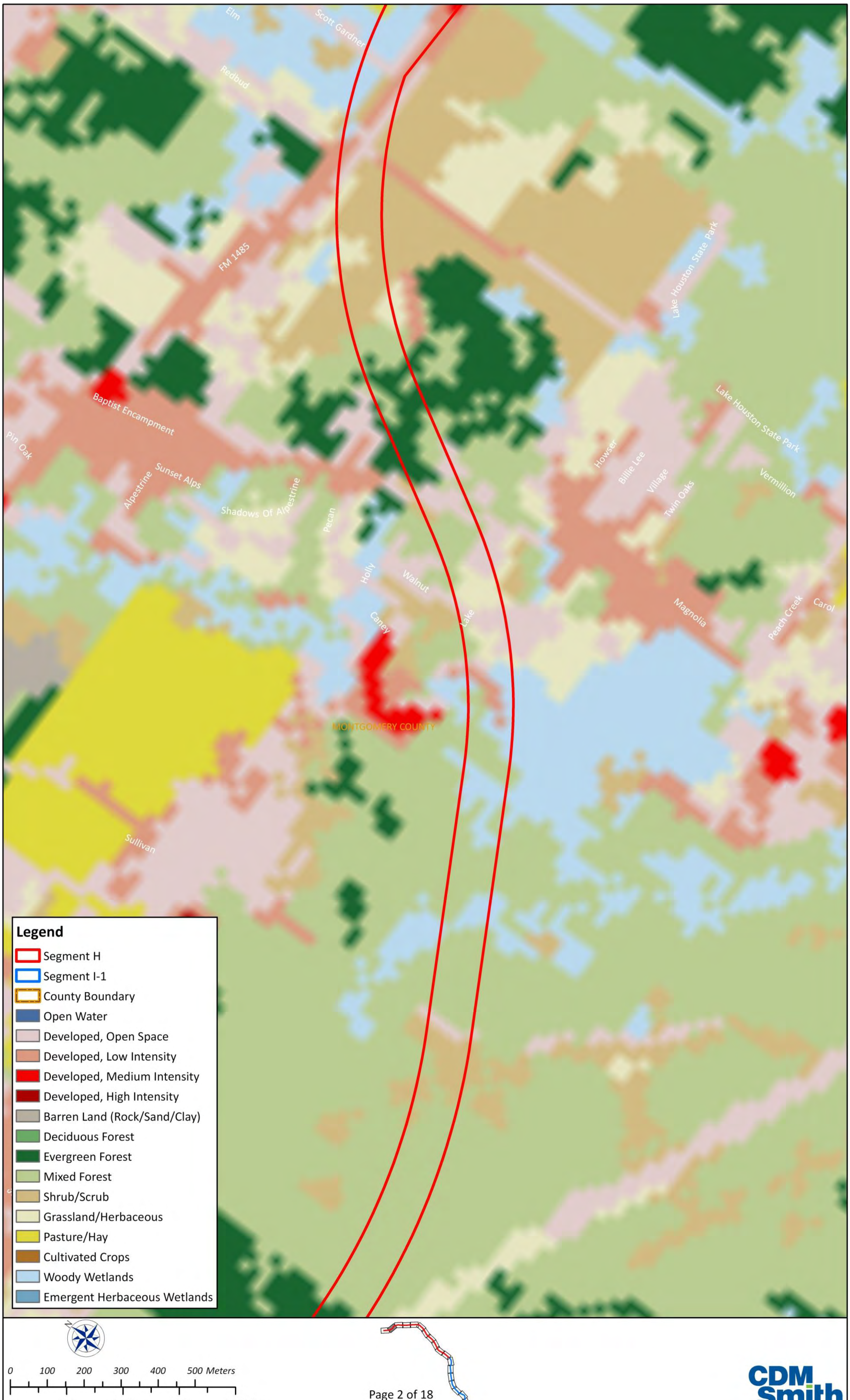


Figure 2-24. Land Use Classification within the APE, Page 2 of 18.

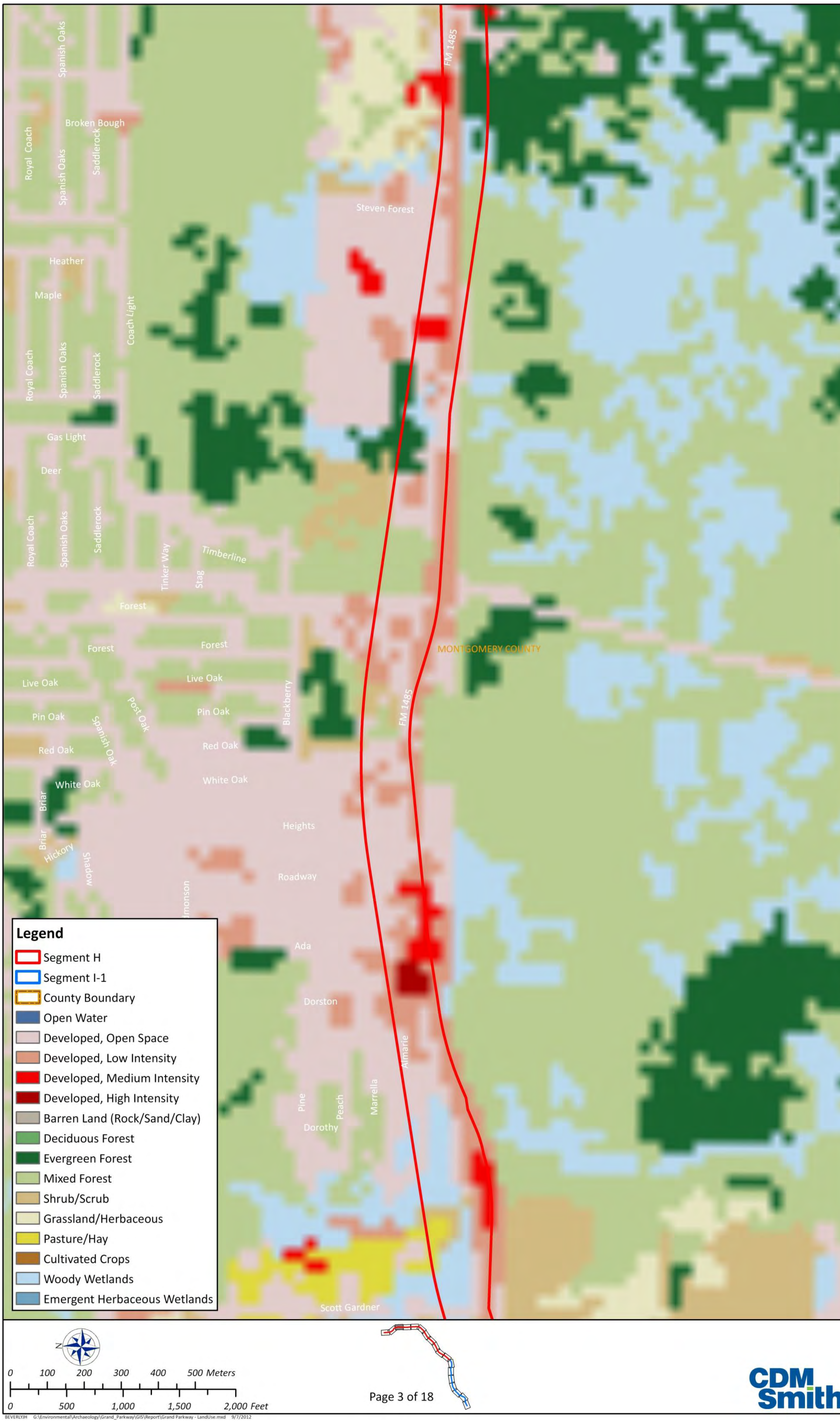


Figure 2-25. Land Use Classification within the APE, Page 3 of 18.

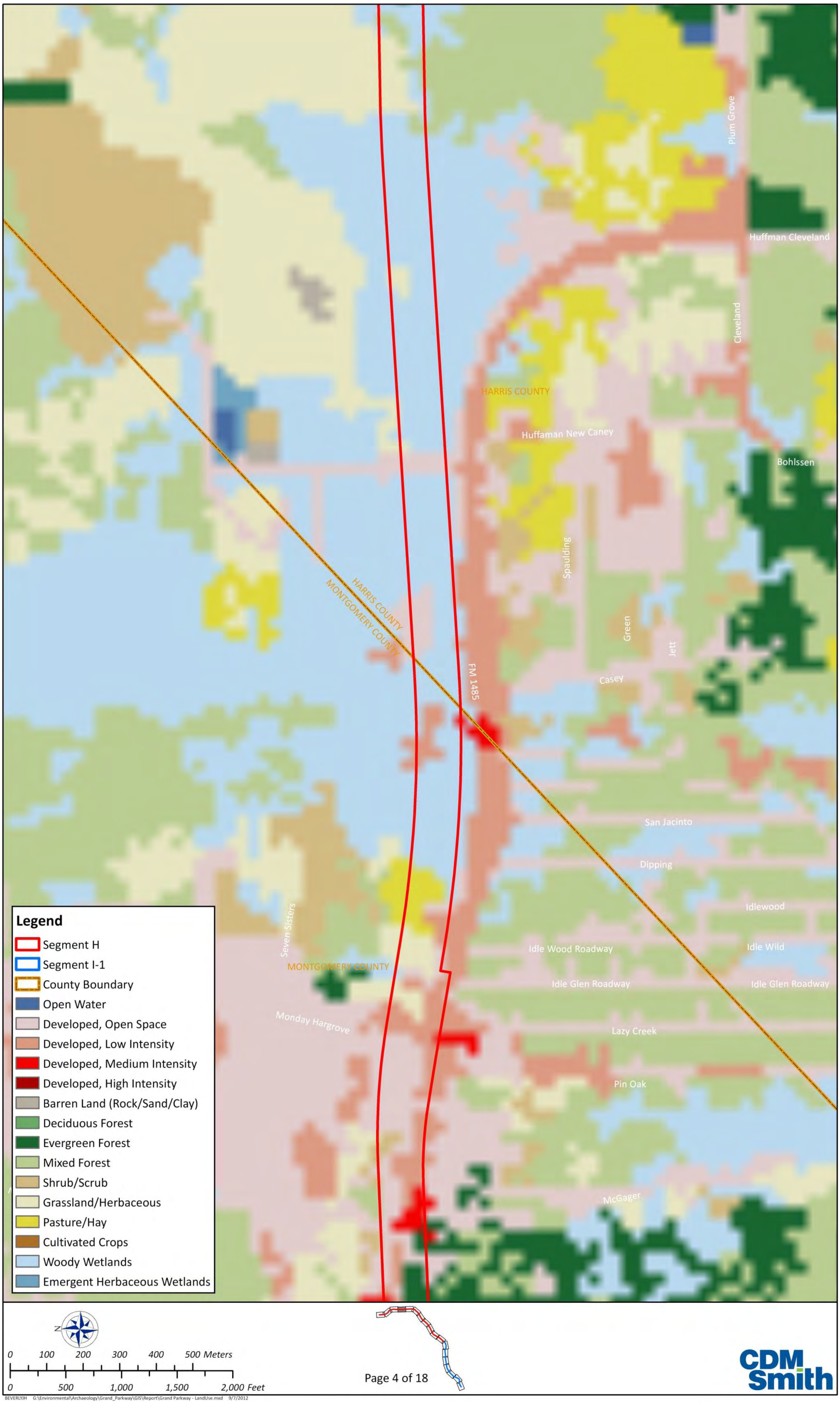


Figure 2-26. Land Use Classification within the APE, Page 4 of 18.

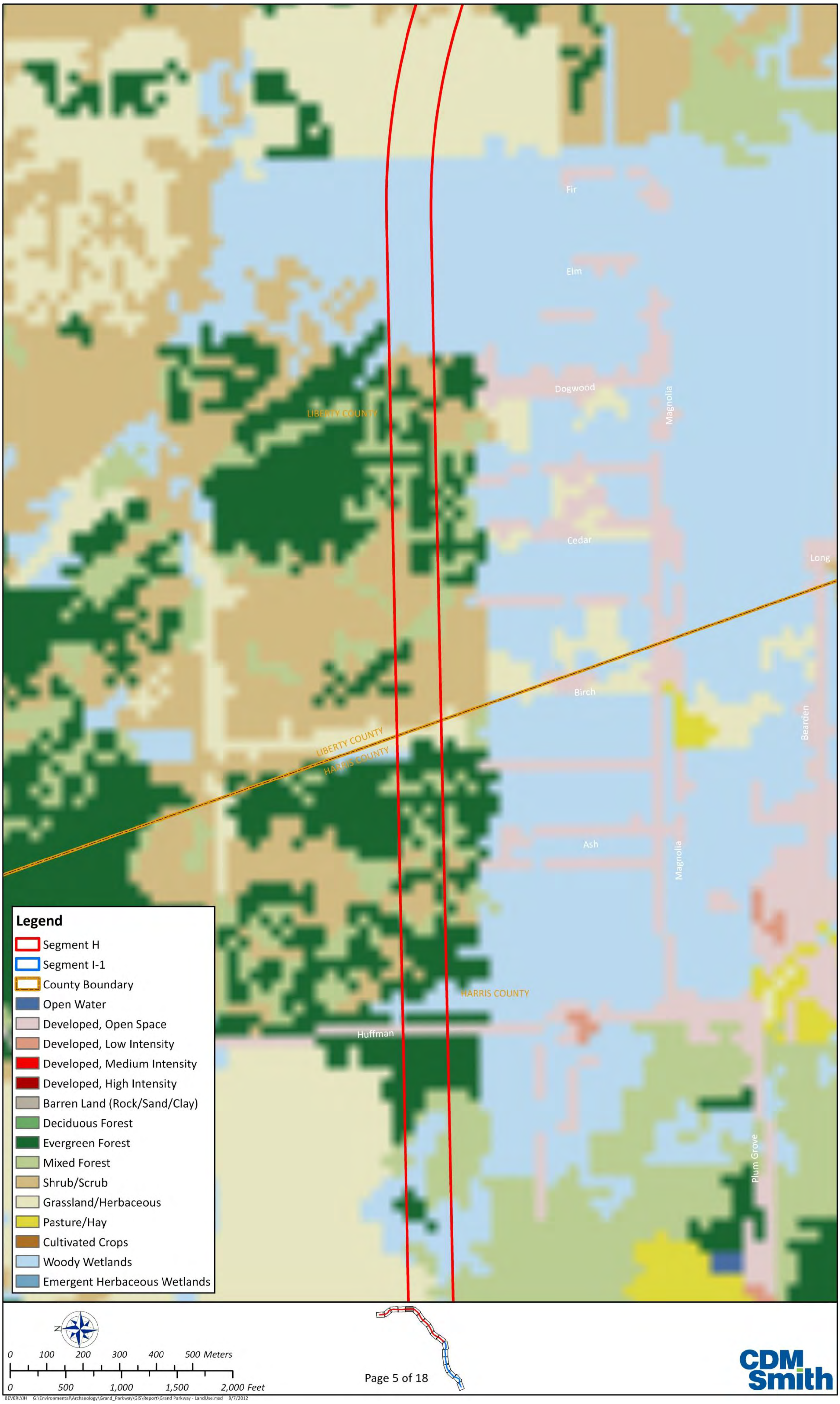


Figure 2-27. Land Use Classification within the APE, Page 5 of 18.

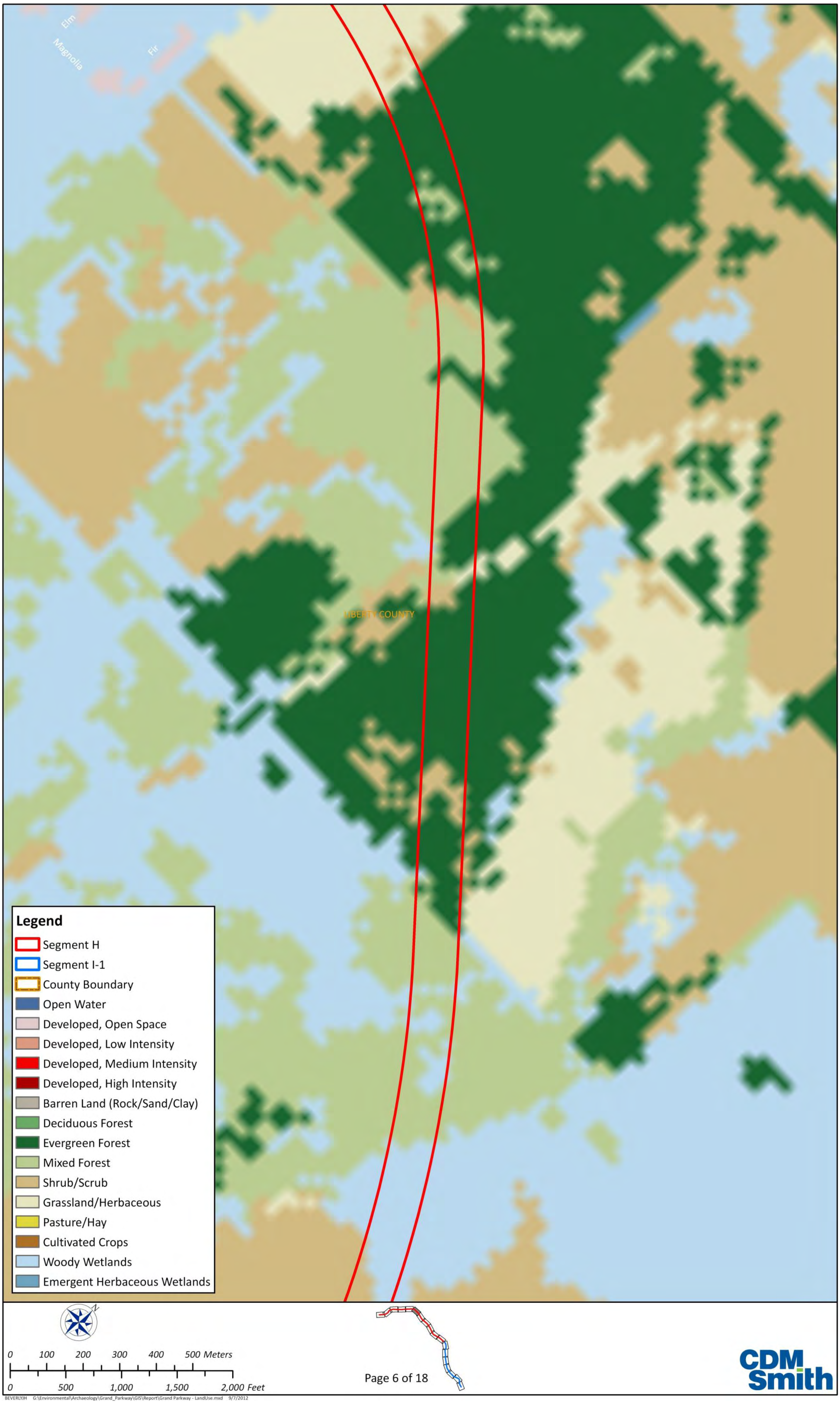


Figure 2-28. Land Use Classification within the APE, Page 6 of 18.

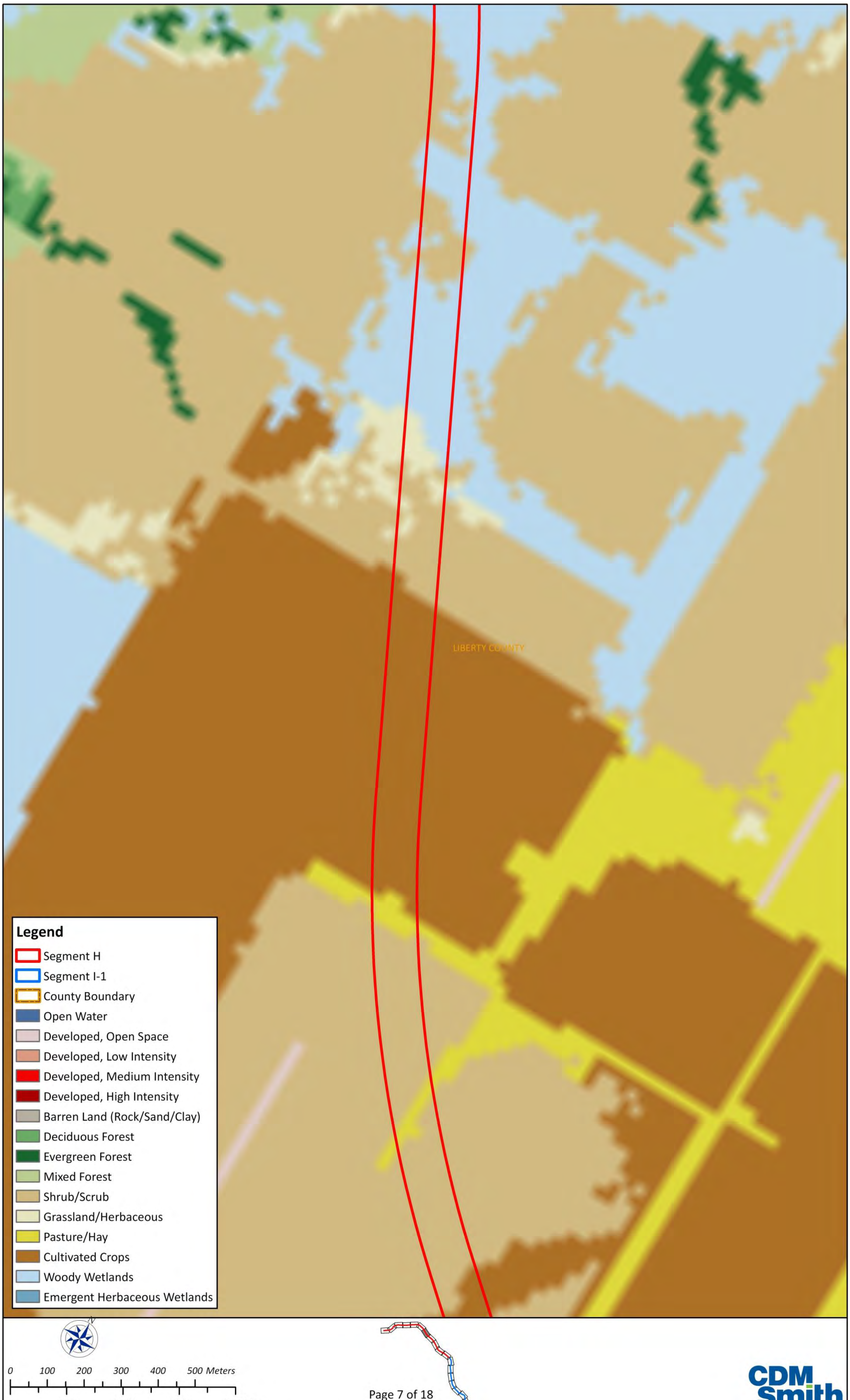


Figure 2-29. Land Use Classification within the APE, Page 7 of 18.

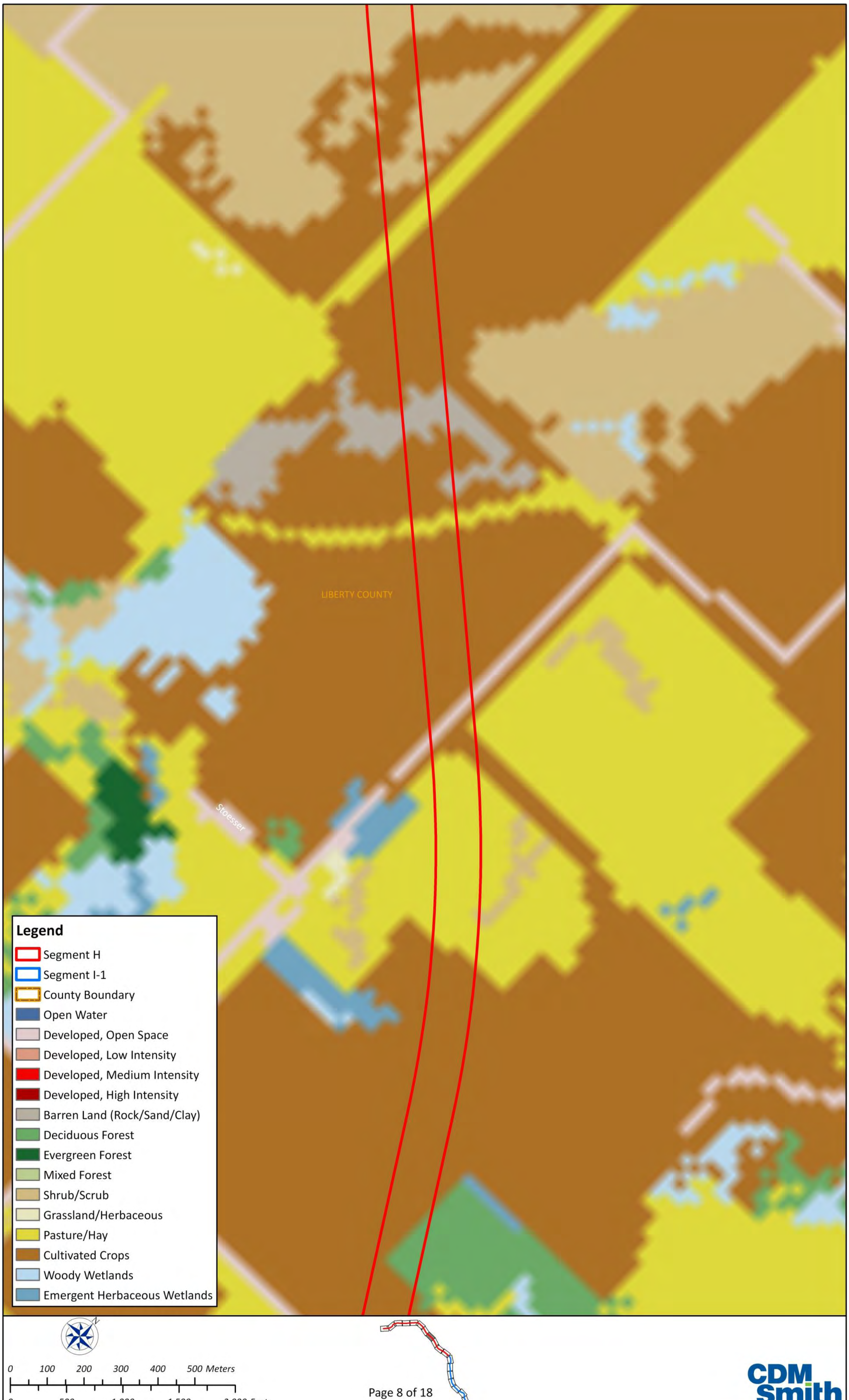


Figure 2-30. Land Use Classification within the APE, Page 8 of 18.

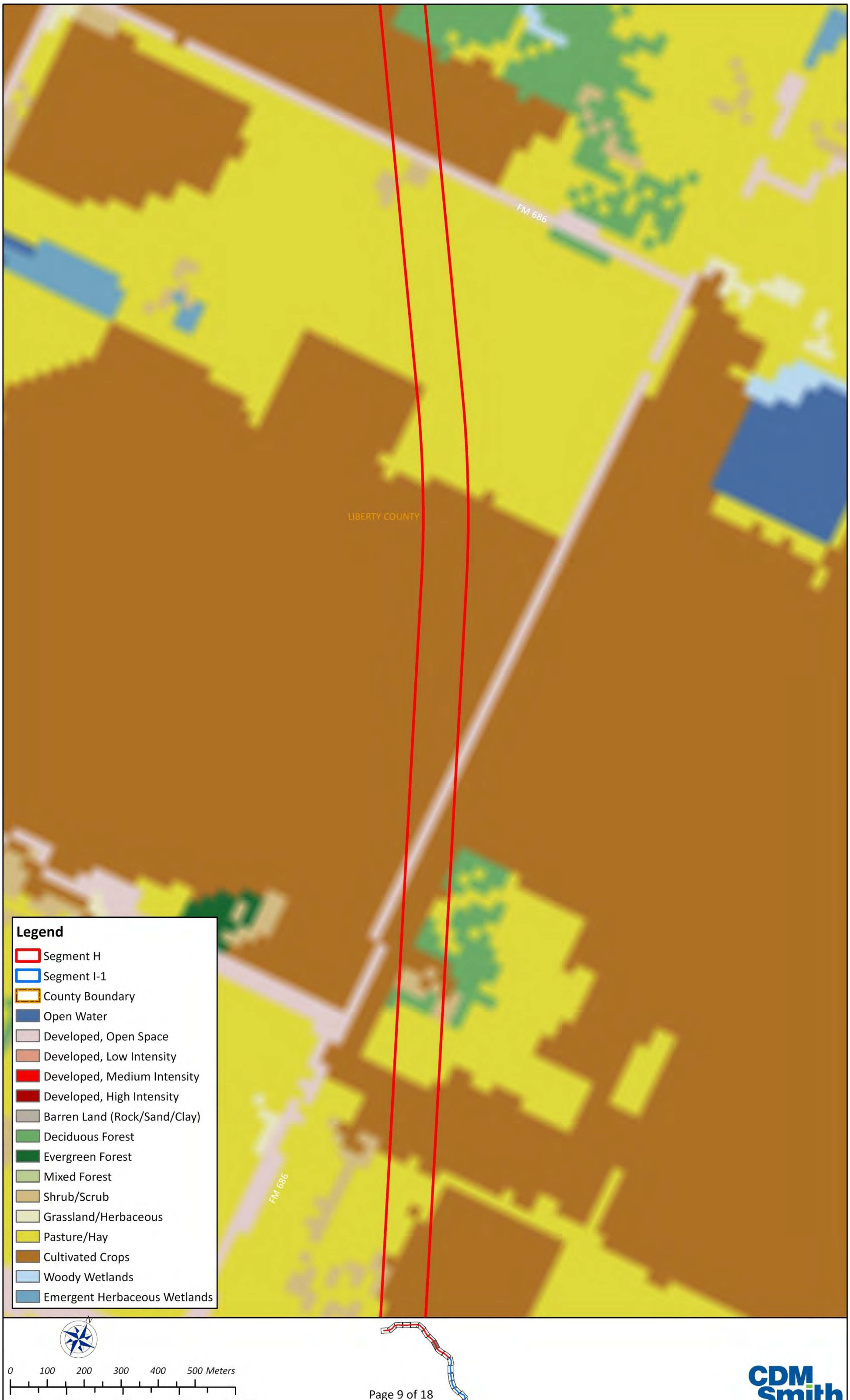


Figure 2-31. Land Use Classification within the APE, Page 9 of 18.

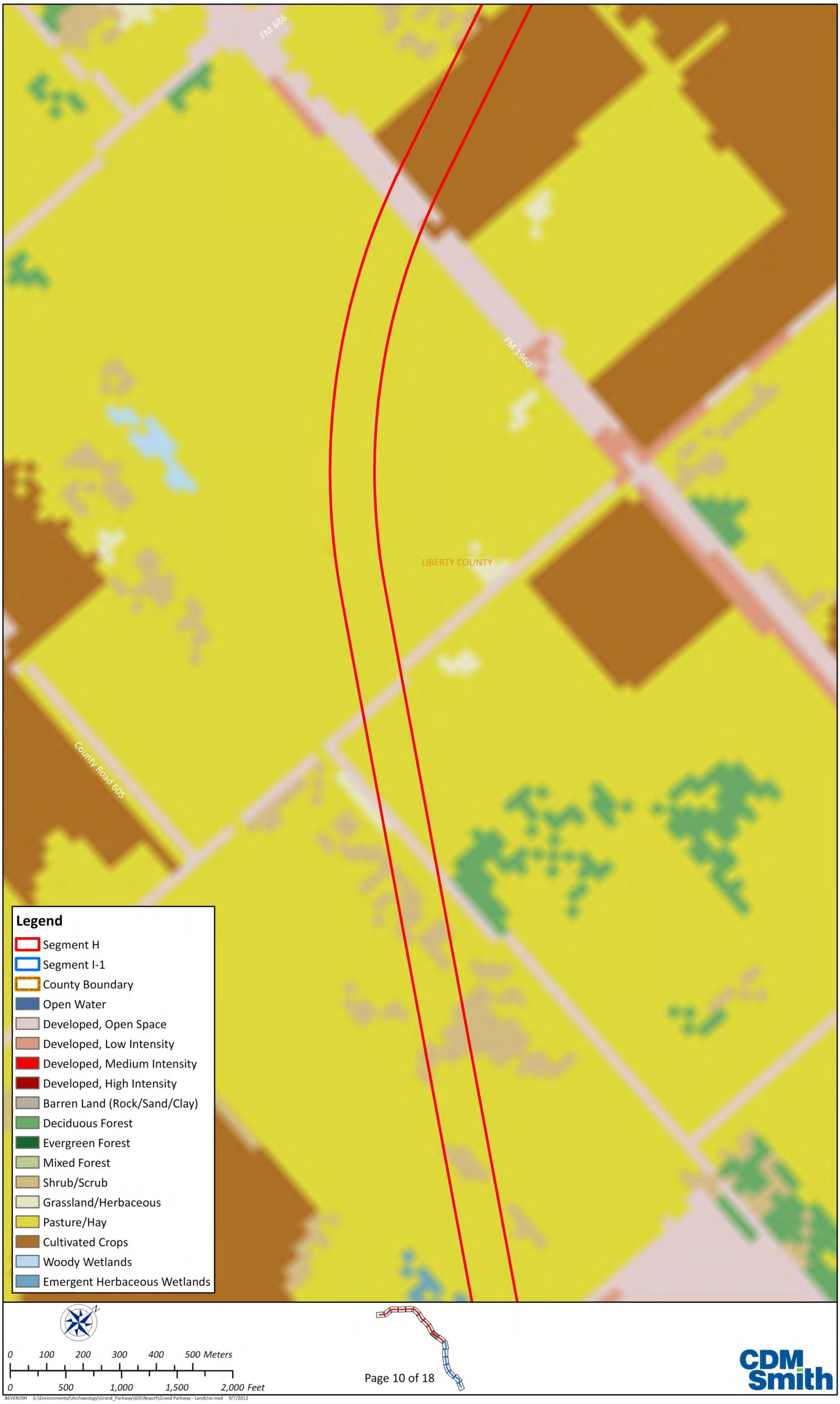


Figure 2-32. Land Use Classification within the APE, Page 10 of 18.

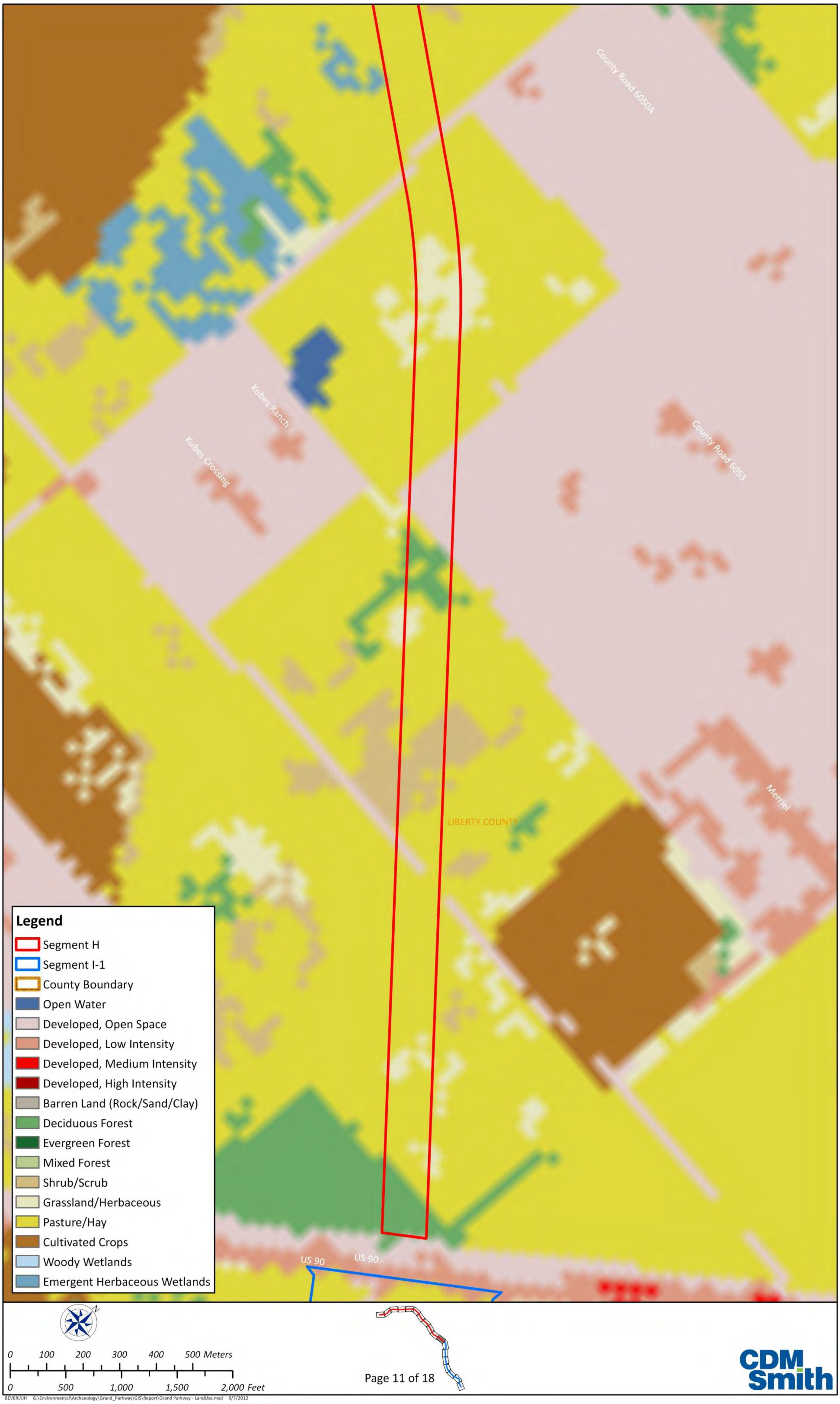


Figure 2-33. Land Use Classification within the APE, Page 1 of 18.

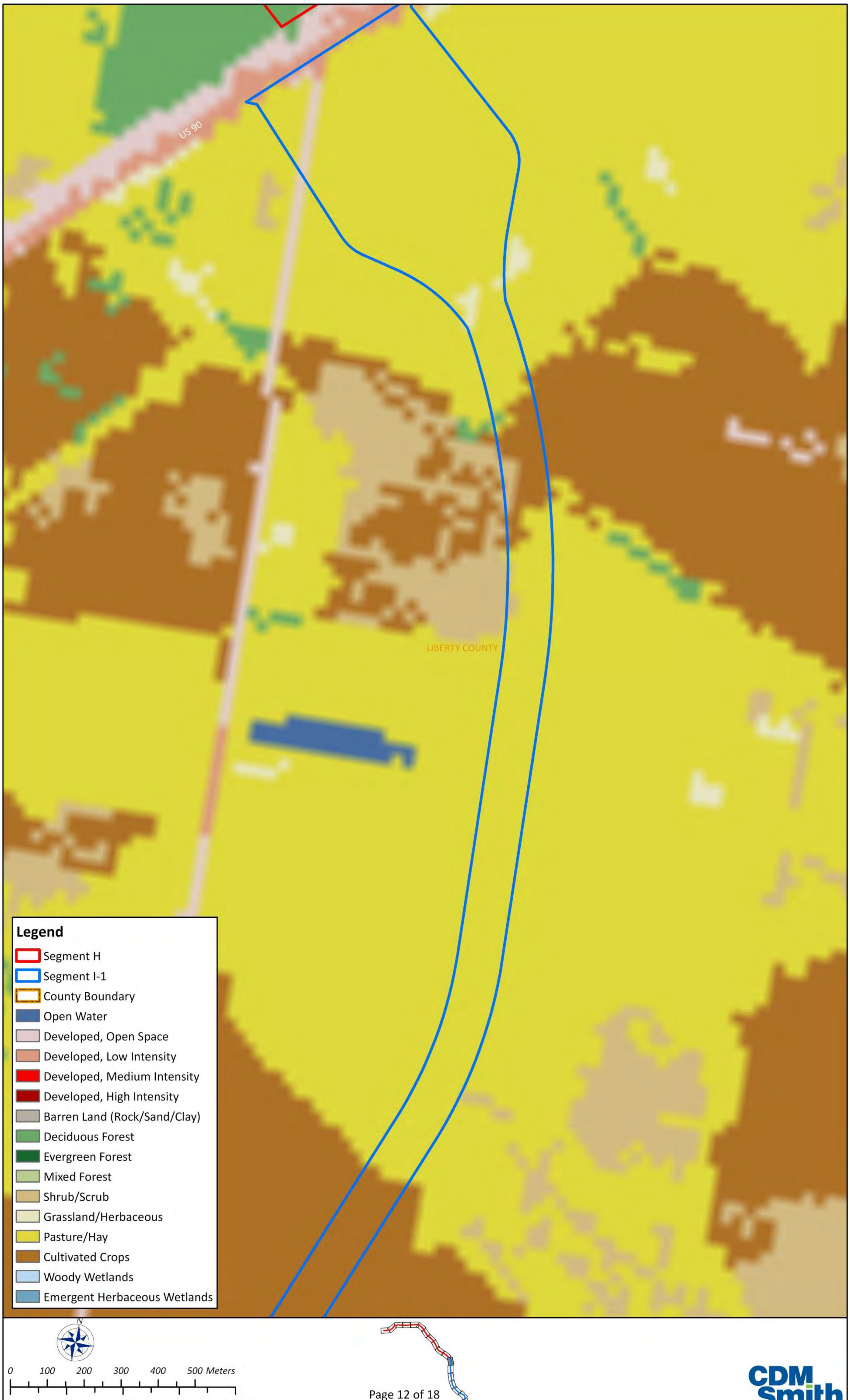


Figure 2-34. Land Use Classification within the APE, Page 12 of 18.

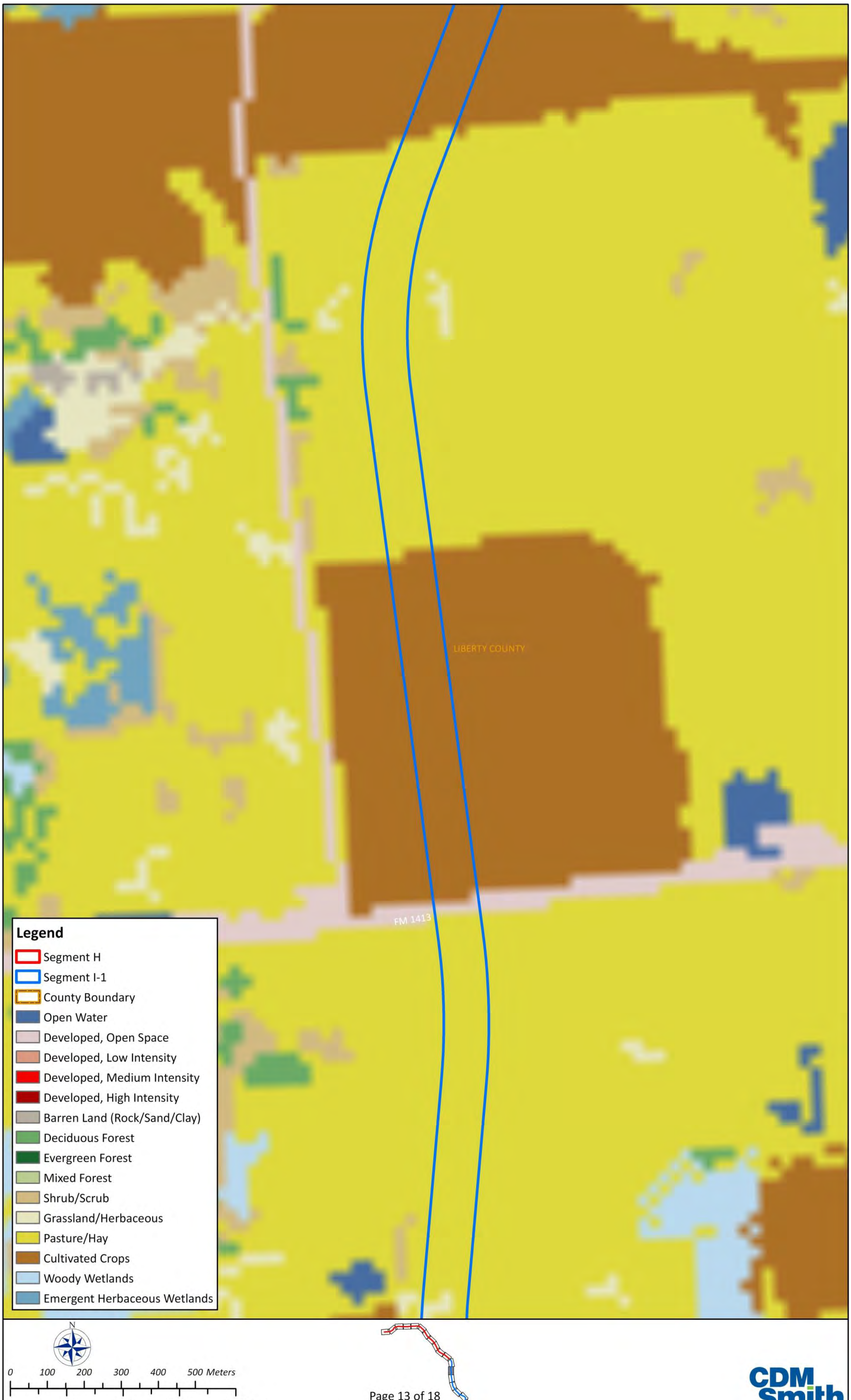


Figure 2-35. Land Use Classification within the APE, Page 13 of 18.

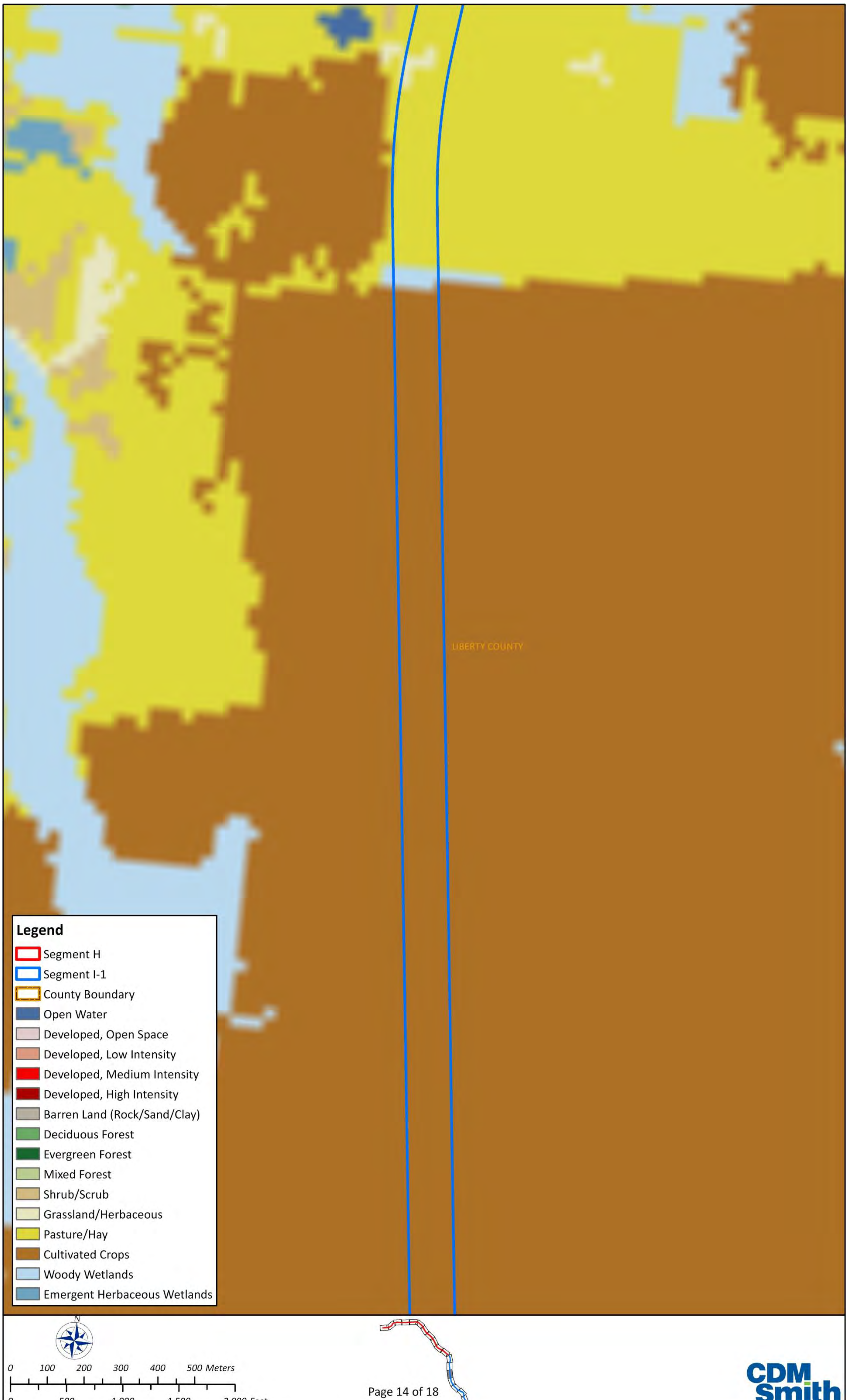


Figure 2-36. Land Use Classification within the APE, Page 14 of 18.

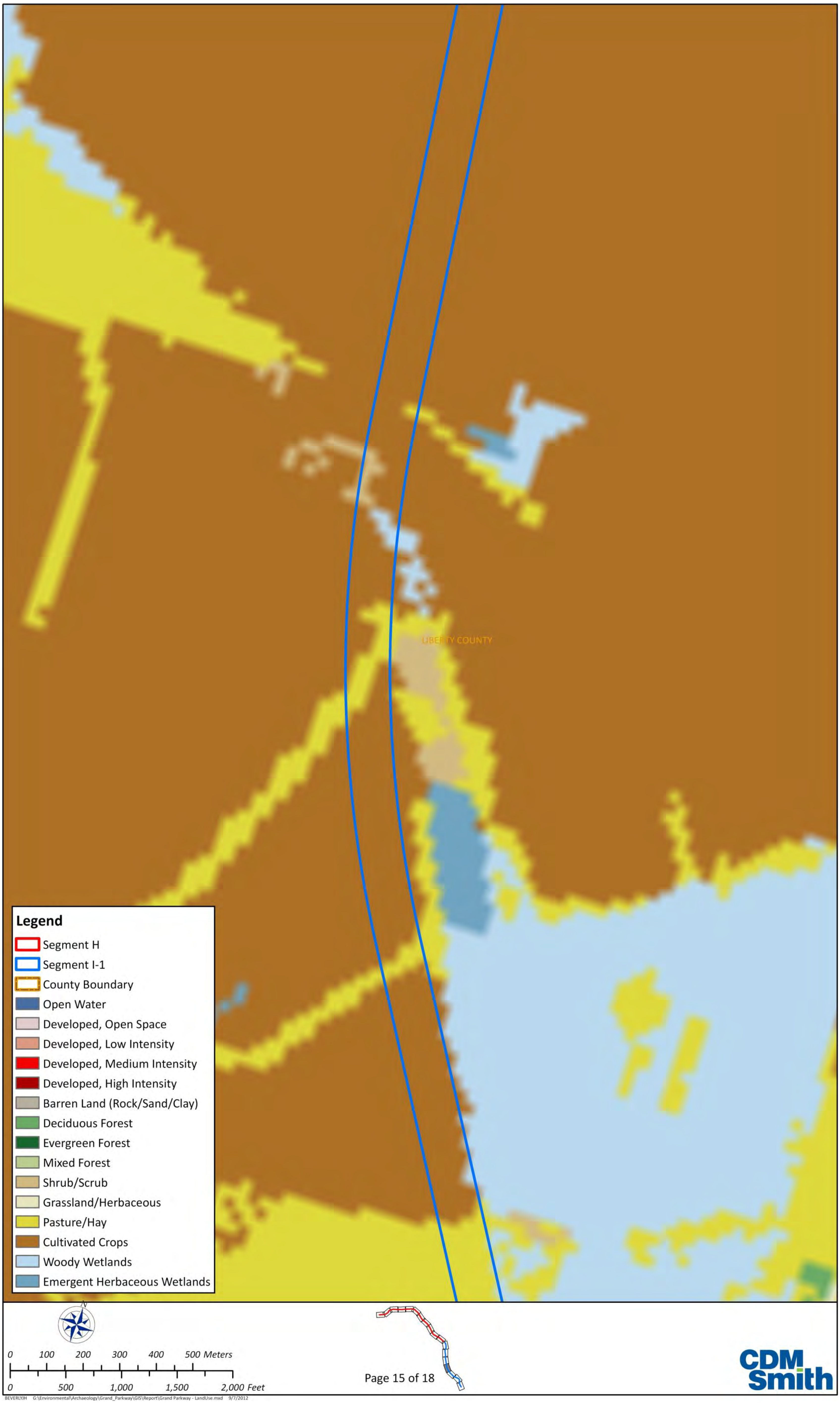


Figure 2-37. Land Use Classification within the APE, Page 15 of 18.

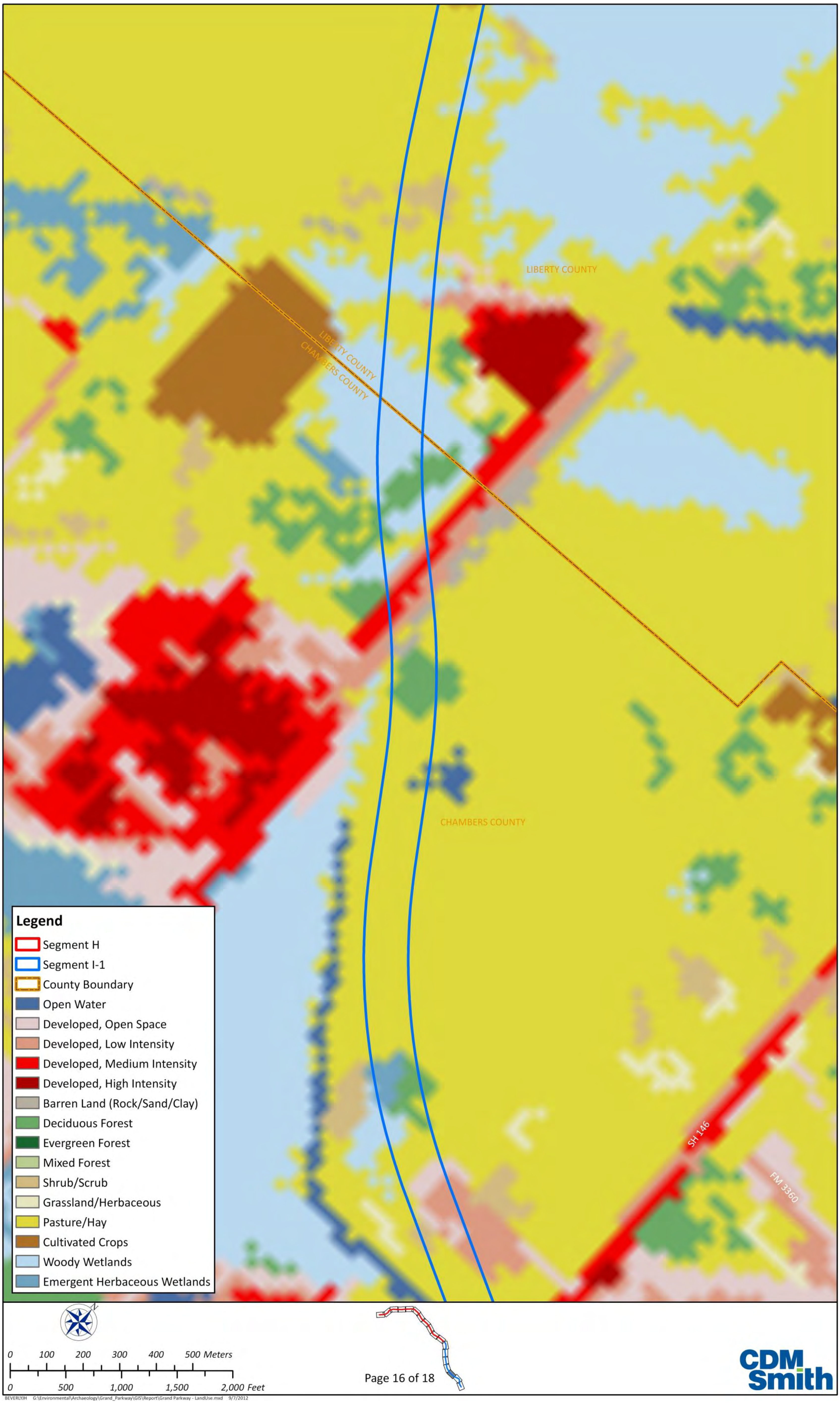


Figure 2-38. Land Use Classification within the APE, Page 16 of 18.

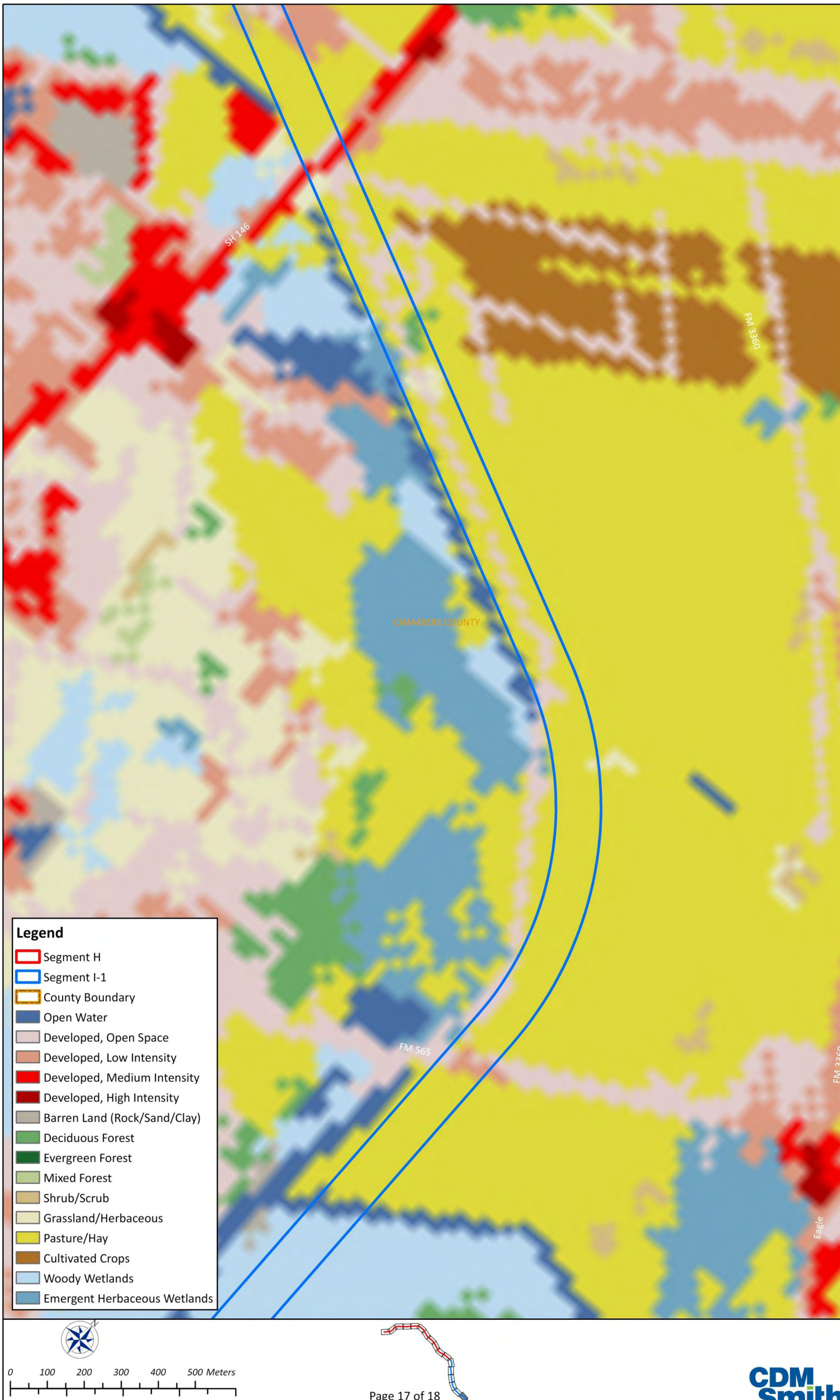


Figure 2-39. Land Use Classification within the APE, Page 17 of 18.

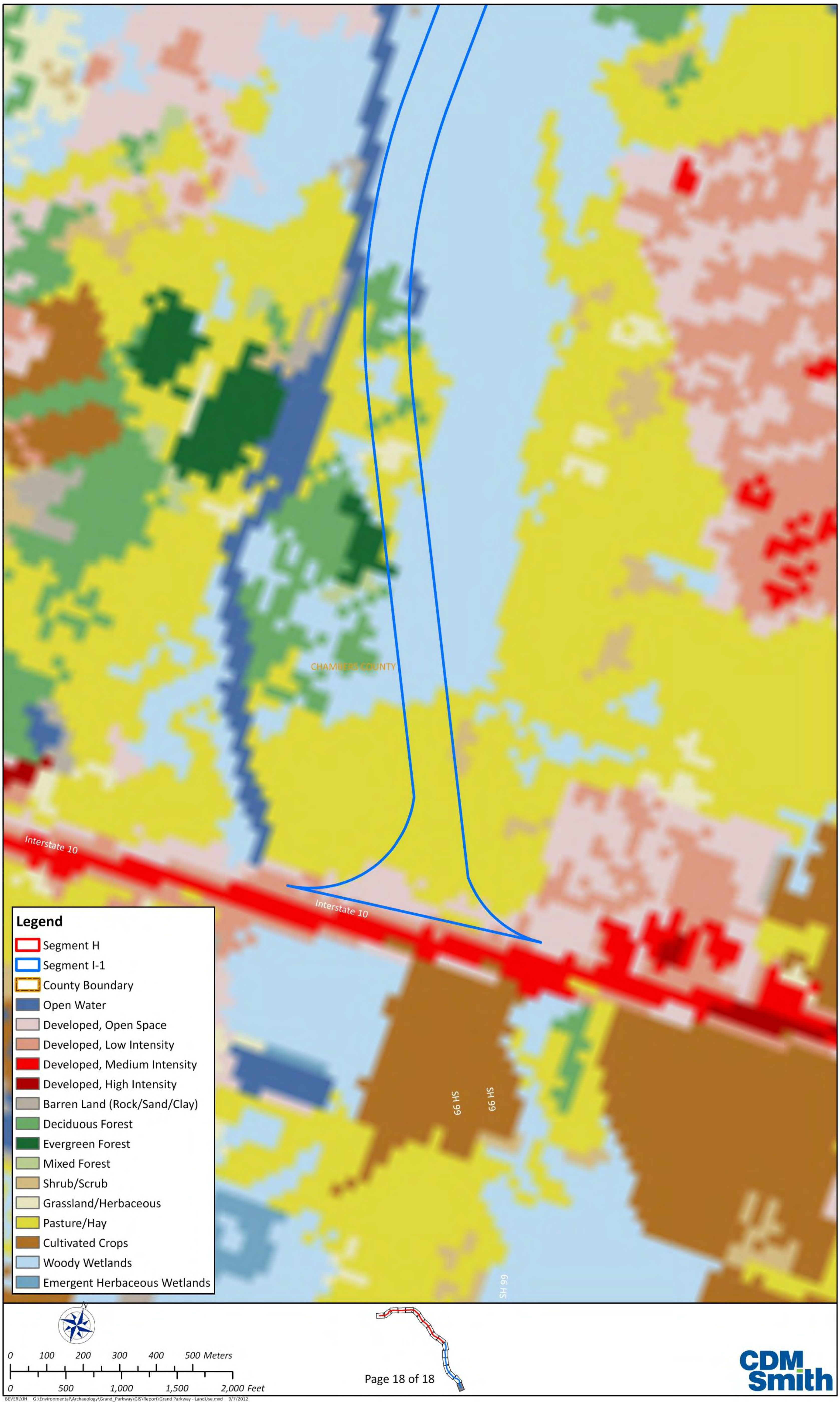


Figure 2-40. Land Use Classification within the APE, Page 18 of 18.

Developed, Low Intensity is defined as areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 20-49 percent of total cover. These areas most commonly include single-family housing units.

Developed, Medium Intensity is defined as areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 50-79 percent of the total cover. These areas most commonly include single-family housing units.

Developed, High Intensity is classified as highly developed areas where people reside or work in high numbers. Examples include apartment complexes, row houses and commercial/industrial. Impervious surfaces account for 80 to100 percent of the total cover.

Barren Land (Rock/Sand/Clay) areas is defined as being composed of bedrock, desert pavement, scarps, talus, slides, volcanic material, glacial debris, sand dunes, strip mines, gravel pits and other accumulations of earthen material. Generally, vegetation accounts for less than 15% of total cover.

Deciduous Forest is classified as areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. More than 75 percent of the tree species shed foliage simultaneously in response to seasonal change.

Evergreen Forest is classified as areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. More than 75 percent of the tree species maintain their leaves all year. Canopy is never without green foliage.

Mixed Forest is defined as areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. Neither deciduous nor evergreen species are greater than 75 percent of total tree cover.

Shrub/Scrub areas are classified as being dominated by shrubs; less than 5 meters tall with shrub canopy typically greater than 20% of total vegetation. This class includes true shrubs, young trees in an early successional stage or trees stunted from environmental conditions.

Grassland/Herbaceous is classified as areas dominated by grammanoid or herbaceous vegetation, generally greater than 80% of total vegetation. These areas are not subject to intensive management such as tilling, but can be utilized for grazing.

Pasture/Hay is classified as areas of grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops, typically on a perennial cycle. Pasture/hay vegetation accounts for greater than 20 percent of total vegetation.

Cultivated Crops is defined as areas used for the production of annual crops, such as corn, soybeans, vegetables, tobacco, and cotton, and also perennial woody crops such as orchards and vineyards. Crop vegetation accounts for greater than 20 percent of total vegetation. This class also includes all land being actively tilled.

Woody Wetlands is classified as areas where forest or shrub land vegetation accounts for greater than 20 percent of vegetative cover and the soil or substrate is periodically saturated with or covered with water.

Emergent Herbaceous Wetlands areas are defined as where perennial herbaceous vegetation accounts for greater than 80 percent of vegetative cover and the soil or substrate is periodically saturated with or covered with water.

Section 3 -

Research Design

In this section, the research design and methods employed during the course of the intensive archaeological survey conducted for the Grand Parkway Association (GPA) of the proposed Grand Parkway Segments H and I-1 located in parts of Montgomery, Harris, Liberty, and Chambers counties, on the northeast side of the greater Houston metropolitan area from US 59 (N) to IH 10 (E) generally between FM 2100 and SH 146, is presented. The discussion of the design includes a description of the fieldwork methods and their application in different portions of the project area.

3.1 Purpose

The purpose of the intensive archaeological survey is to assist TXDOT and GPA with complying with Section 106 of the National Historic Preservation Act (NHPA), the National Environmental Policy Act (NEPA), and Section 4(f) of the Department of Transportation (DOT) Act requirements by identifying and evaluating all archaeological, traditional, cultural, and religious place resources within the APE. The research design for the background records check and field methods used to address these goals are described below.

3.2 Predictive Model

The Houston Potential Archaeological Liability Mapping (PALM) was examined for applicability to this project. The Houston PALM models the preservation potential of the environment, identifying where on the landscape prehistoric archaeological sites are likely to be preserved with reasonable integrity. It identifies areas where the character or age of geological deposits is not consistent with the preservation of archaeological sites in good Context. It also identifies areas where depositional processes had been active during the Late Pleistocene/Holocene, requiring deep mechanical prospecting to locate buried prehistoric archeological sites.

Only a small part of the APE within Harris and Montgomery counties is covered under the Houston PALM model (Figure 3-1). The Houston PALM model does not extend to either Liberty or Chambers counties.

To cover these two counties and to present a unified approach to modeling for the project area overall, a historic and prehistoric model were developed by CDM Smith in 2006 encompassing the original Grand Parkway Segments H and I-1 Draft Environmental Impact Statement study area (Figure 3-2and Figure 3-3). These two models used a variety of datasets do develop a grid with scores ranging from 1 to 3. The score reflect a combination of behavioral settlement processes and current land conditions. Areas more likely to be settled under the models were score upward to 3 points. Then current land conditions that would likely yield in destroyed or no archaeological sites were scored downward to 1 point. The average of these two scored identified areas where prehistoric and historic sites were likely to be encountered.

3.3 Field Work

All field work will be conducted in conformance with 36 CFR Part 800, 13 TAC 26.20, and THC's Archeological Survey Standards.

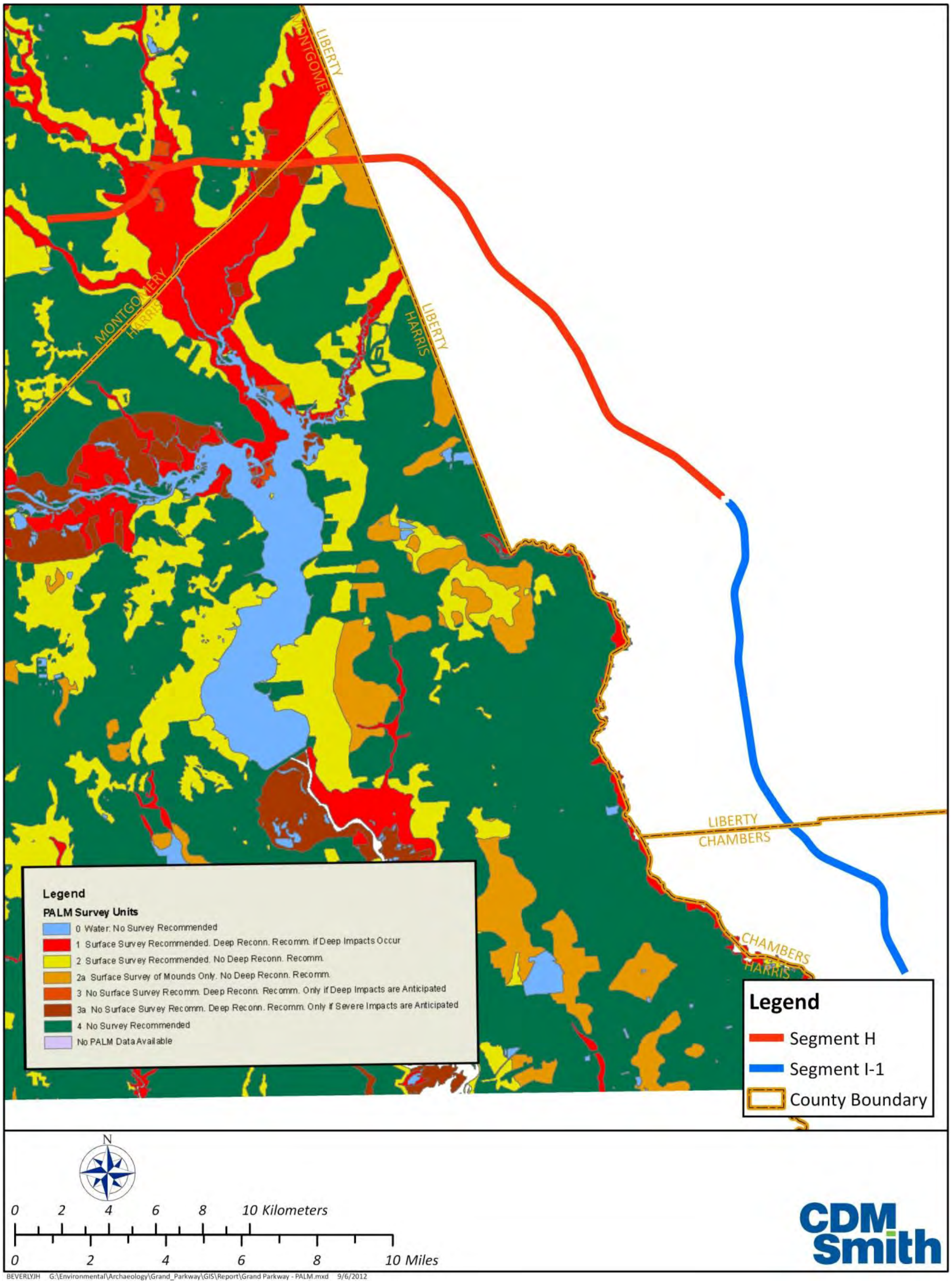


Figure 3-1. Houston Area PALM Model.

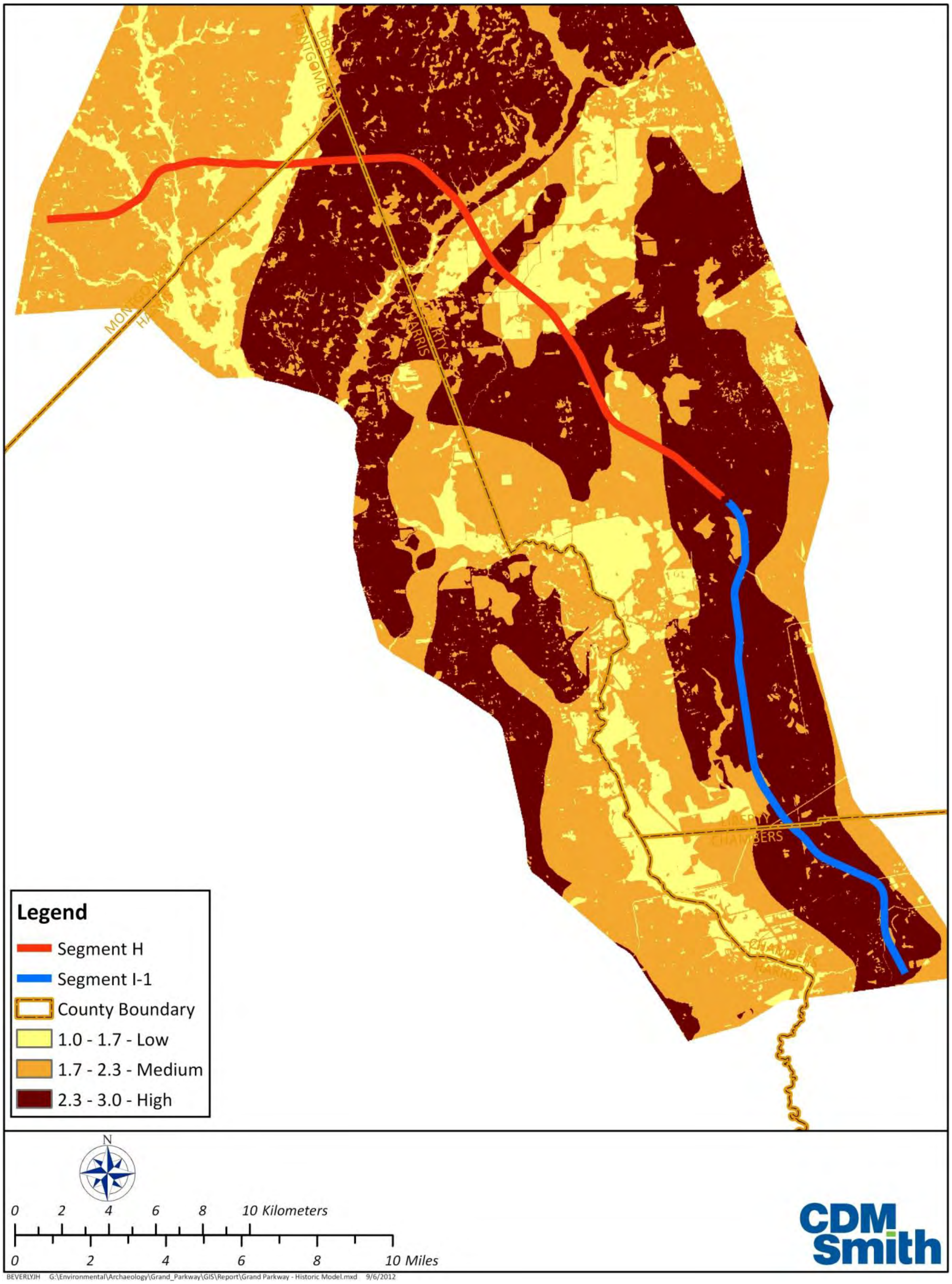


Figure 3-2. CDM Smith Historic Model.

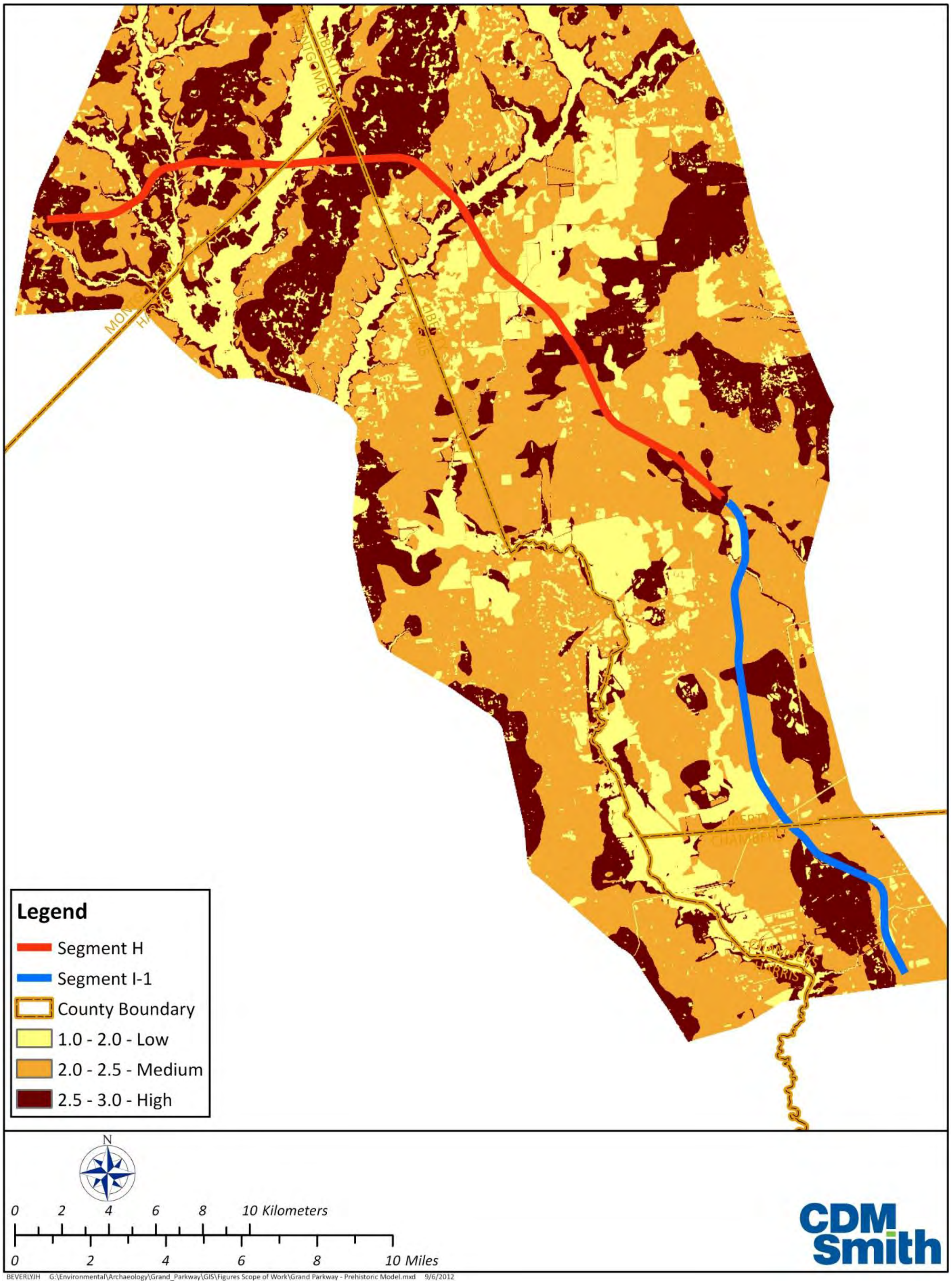


Figure 3-3. CDM Smith Prehistoric Model.

3.3.1 Shovel Testing

Shovel tests were excavated in settings that had the potential for buried cultural materials. They were dug whenever there was less than 30 percent ground surface visibility, except on slopes greater than 20 percent.

Shovel tests were 30 cm in diameter or on a side and excavated to the bottom of Holocene deposits, if possible. They were dug in levels no thicker than 20 cm with sediments screened through ¼-inch mesh, unless high clay or water content required that they be troweled through. One shovel test was excavated for every three acres.

3.3.2 Ground Surface Collection

In areas with greater than 30 percent ground surface visibility, a systematic surface collection of prehistoric and historic cultural materials was made. Surface collection intervals did not exceed 10 m. The vertical extent of the deposit was defined (e.g., shovel or auger probes) and an assessment made of potential for intact cultural deposits. If a surface collection did contain a high number of artifacts, a sampling procedure appropriate for the circumstances was implemented.

3.3.3 Areas of Disturbance

Areas of disturbance, such as landscaping, underground utility, previous construction and areas greater than 20 percent slope within the APE was photo documented and not shovel tested. If sites were discovered, they were to be documented in compliance with THC specifications.

3.3.4 Property denied or with no Right-of-Entry

If permission had not been obtained or entry denied, an assessment was made on the potential for cultural materials to be present.

3.3.5 Human Remains

If human remains were discovered under any circumstances, they were secured and protected until such time as appropriate disposition had been determined, in accordance with applicable local, state, and federal statutes.

3.3.6 Undocumented Cemeteries

If an undocumented cemetery was discovered, the policy and procedures set forth in Section 711.011 of the Texas Health and Safety Code was followed.

3.4 Parcel Access and Field Conditions

HNTB Corporation contracted with RODS Surveying, Inc. to stake the proposed right-of-way boundaries at intervals of 400± feet. As part of this effort they also gained permission for entry. The results of their efforts are presented in Table 3.1. A large number of landholders, 57%, had not been contacted by RODS Surveying by June 2012 for reasons unknown to the author. Of the remaining area, only thirty-three percent of the survey area was available for testing. Ten percent of contacted land owners denied entry.

Table 3.2 presents a summary of areas that were tested, those that were previously surveyed, and those not tested.

Table 3.1. Permission Status.

Entry Permission	Acre	Hectare	Percentage
Entry Granted	456	185	23%
Entry Granted with Instructions	198	80	10%
Entry Denied	190	77	10%
Not Contacted	1134	458	57%
Grand Total	**1978**	**800**	**100%**

Table 3.2. Summary of areas Tested/Not Tested.

Tested/Not Tested	Acre	Hectare	Percentage
Tested	654	265	33%
Previously Surveyed	212	86	11%
Not Tested	1112	449	56%
Grand Total	**1978**	**800**	**100%**

3.5 Parcels Granted Entry but Not Tested

A couple of parcels where permission for entry was granted were not tested for various reasons. During the survey of parcel R52618 and R52647 in Montgomery County (Figure 3-4), signs warning of radiation were encountered along an access road (Figure 3-5). Testing of this area was suspended. Attempts to contact the landowner were not successful.

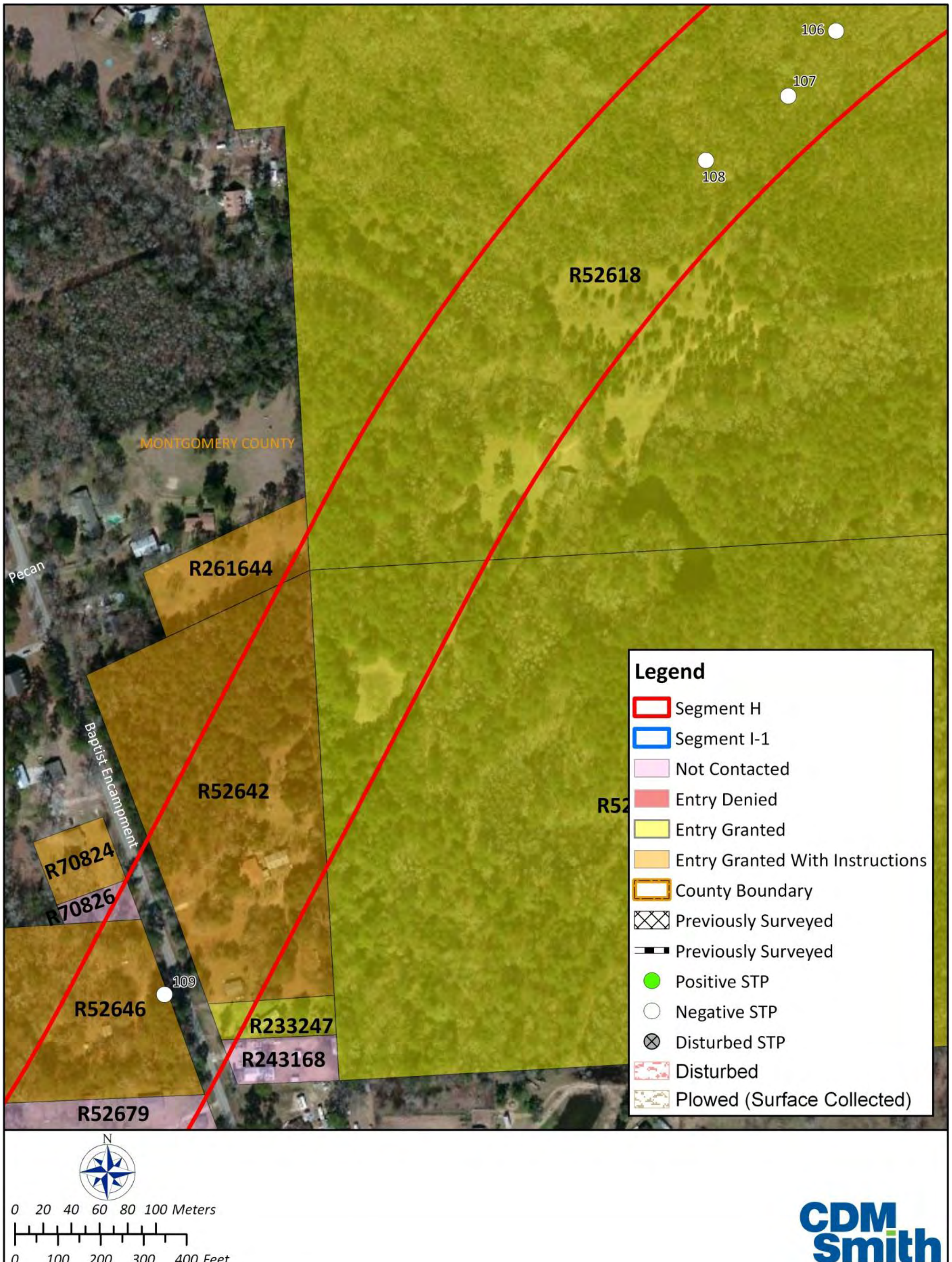
Permission was granted, with instructions for parcel R52642 in Montgomery County (see Figure 3-4). However, attempts to contact the landowner at the cell phone number provided as the contact point were not successful.

Permission was granted, with instructions for parcel 13233 and 13234 in Chambers County (Figure 3-6). However, the instructions for entry were not provided and attempts to contact the land owner were not successful.

3.6 National Register Evaluation

Section 106 of the National Historic Preservation Act of 1966 requires federal agencies to take into account the effects of their undertakings on properties listed or eligible for listing in the National Register and to give the Advisory Council on Historic Preservation a reasonable opportunity to comment. While it does not require the preservation of such properties, it does require that their historic or prehistoric values be considered in weighing the benefits and costs of federal undertakings to determine what is in the public interest. Section 106 is invoked when "any project, activity, or program that can result in changes in the character or use of historic properties" (36 CFR Part 800) is undertaken whether federal agency jurisdiction is direct or indirect.

Pursuant to the October 1992 Amendments to the National Historic Preservation Act (Section 110 of NHPA 1980, amended 1992) an "undertaking" means a project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a federal agency, including (A) those carried out



BEVERLYJH C:\WSA_PROJECTS\Grand_Parkway\GIS\Report\Grand Parkway - Parcels Not Tested1 (aerial).mxd 9/9/2012

Figure 3-4. Parcels Granted Entry But Not Tested, Montgomery County.

Figure 3-5. Radiation Warning Sign.

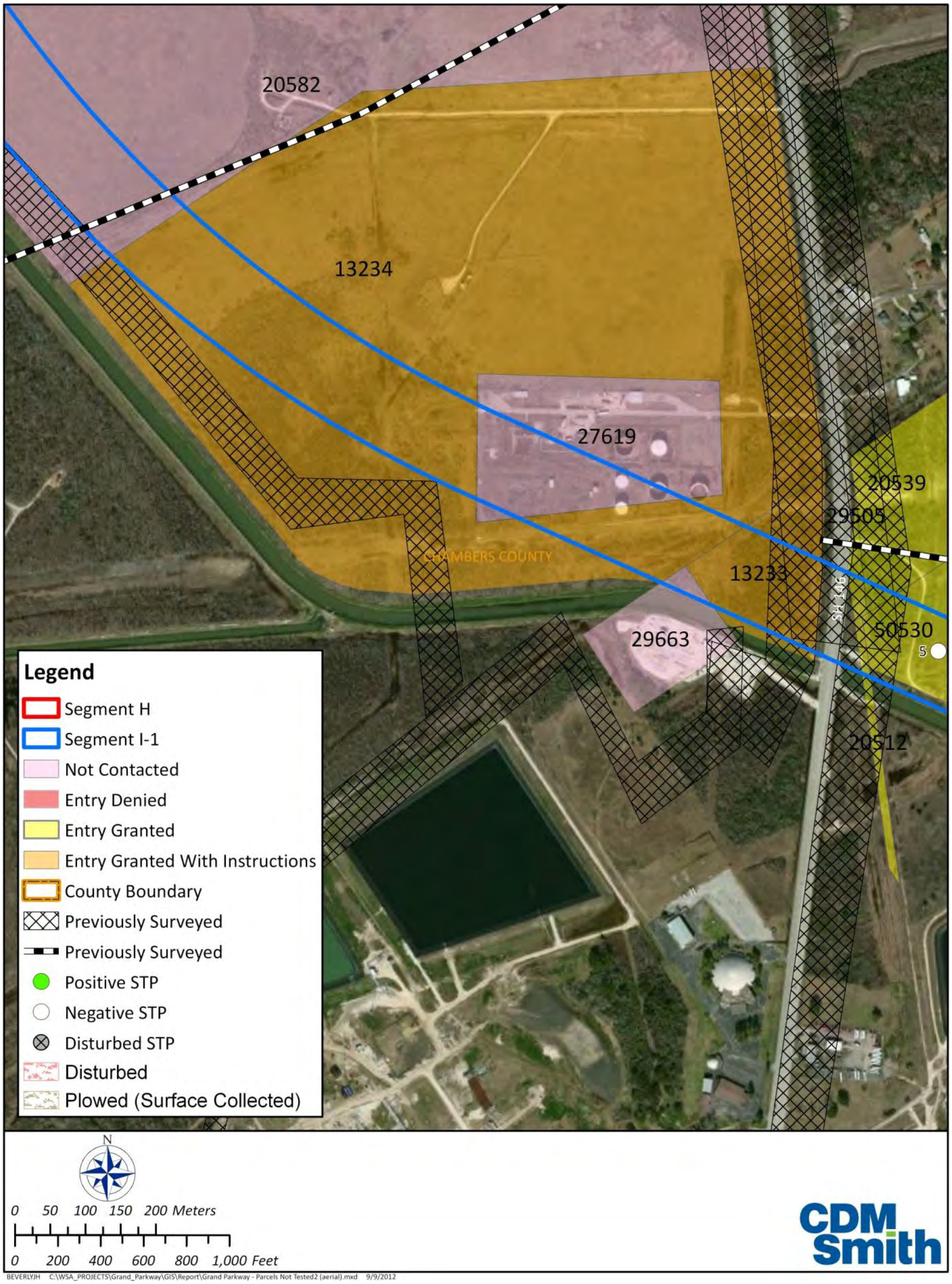


Figure 3-6. Parcels Granted Entry But Not Tested, Chambers County.

by or on behalf of the agency; (B) those carried out with federal financial assistance; (C) those requiring a federal permit, license, or approval; and (D) those subject to state or local regulation administered pursuant to a delegation or approval by a federal agency.

The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

A. that are associated with events that have made a significant contribution to the broad patterns of our history; or

B. that are associated with the lives of persons significant in our past; or

C. that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic value, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

D. that have yielded, or may be likely to yield, information important in prehistory or history.

Mere association with historic events or trends is not enough, in and of itself, to qualify under Criterion A-the property's specific association must be considered important as well. Often, a comparative framework is necessary to determine if a site is considered an important example of an event or pattern of events.

In order to qualify under Criterion B, the persons associated with the property must be individually significant within a historic context. As with all Criterion B properties, the individual associated with the property must have made some specific important contribution to history.

To be eligible under Criterion C, a property must meet at least one of the following requirements: the property must embody distinctive characteristics of a type, period, or method of construction, represent the work of a master, possess high artistic value, or represent a significant and distinguishable entity whose components may lack individual distinction.

Criterion D requires that a property "has yielded, or may be likely to yield, information important in prehistory or history." Most properties listed under Criterion D are archaeological sites and districts, although extant structures and buildings may be significant for their information potential under this criterion. To qualify under Criterion D, a property must meet two basic requirements:

- The property must have, or have had, information that can contribute to our understanding of human history of any time period;
- The information must be considered important.

3.6.1 Evaluating Archaeological Sites

The use of Criteria A, B, and C for archaeological sites are appropriate in limited circumstances and have never been supported as a universal application of the criteria. However, it is important to consider the applicability of criteria other than D when evaluating archaeological properties. It is important to note that under Criteria A, B, and C the archaeological property must have demonstrated its ability to convey its significance, as opposed to sites eligible under Criterion D, where only the potential to yield information is required.

Section 4 - Previous Investigations and Archaeological Background

This section presents an overview of the regional settings and cultural history of the project area through a review of the prehistoric and historic cultural history for the region.

4.1 Prehistoric Context

The prehistory of Texas spans at least 13,000 years from at least 11,000 B.C. to the times of European contact in the seventeenth century. The periods of Texas' prehistory are divided into three board periods, Paleoindian, Archaic, and the Late Prehistoric.

4.1.1 Paleoindian (11,500 B.C. – 6,000 B.C.)

The Paleoindian period represents the earliest known occupation in the East Central Texas. People during this period relied on mega fauna (predominantly mammoth and Bison antiquus) as well as broader-based hunting and gathering for their subsistence needs. Paleoindian artifacts included distinctive lanceolate projectile points, side scrapers, end scrapers, gravers, modified flake tools, and drills. These tools are sometimes found associated with the remains of extinct mega fauna species. Typically, Paleoindian sites are located near playa lakes and relict streambeds or along small rises and ridges. These sites are usually ephemeral, however, and may be difficult to recognize. Differences in topographic settings and artifact and faunal assemblages have led archaeologists to interpret Paleoindian sites in terms of function classes, based on the activities inferred to have taken place there. Typical site types of this period include campsites, kill sites, processing sites, and quarry sites. During the Paleoindian period, the climate was vastly different than it is today. It has been marked by continuous environmental change over several thousand years. During the earlier phases, the environment was wetter and cooler. Throughout the course of the Paleoindian period, the climate became increasingly arid with greater seasonal variation. These conditions resulted in shifting vegetation patterns and faunal extinctions, which, in turn, affected Paleoindian subsistence strategies, settlement patterns, and lithic technologies.

4.1.2 Archaic (6,000 B.C. – 700 A.D.)

The Archaic period, lasting some 5,000 to 6,000 years, is ascribed more longevity than other prehistoric cultural periods. Despite the fact that many sites in East Central Texas have been assigned to the Archaic period, relatively little is known about this time period. Subsistence adaptations, during the Archaic period, are thought to have generally changed from a reliance on big game hunting to a more broad-based hunting and foraging strategy. Archaic period occupations are distinguished from earlier and later occupations by side- and corner-notched projectile points, bifaces, flake scrapers, and drills. These sites typically consist of lithic and fire-cracked rock scatters that are often situated in areas that overlook drainages.

4.1.3 Late Prehistoric (700 A.D. to Historic Period)

Beginning sometime between A.D. 600 and 900 and continuing to as late as A.D. 1550, the archeological record of southeastern East Central Texas reflects increasing regional and interregional variability. Also during this period several technological developments occurred, namely the development of the bow and arrow, ceramics, and other distinctive types of stone tools. These developments marked a change of this period from the preceding Archaic. Cultural identifiers during the Late Historic Period include material culture, and hunting patterns. Settlement patterns included sedentary villages, and ceremonial centers. Social-cultural features included an established social hierarchy. One distinctive aspect of the Late Prehistoric was widespread, long-distance trade.

4.2 Historic Context

The history of south-central Texas and the area of Harris, Liberty, Chambers, and Montgomery Counties begin with the Spanish explorer Alvar Nunez Cabeza de Vaca. When a Spanish expedition's ship was wrecked off the coast of present day Harris County in 1528, Cabeza de Vaca was one of four survivors held prisoner for six years by natives. After his escape and return to Spain, his accounts inspired exploratory visits in 1540 and 1542 by Spaniards who sought after, unsuccessfully, the silver and gold sources Cabeza de Vaca claims to have heard the natives describe. France stepped up activities and territorial claims along the Mississippi in the late-17th century. It was in 1685 that Fort St. Louis was established by French explorer Robert Cavalier Sieur de La Salle in southeast Texas, south of present day Harris County on Garcita's Cove of Lavaca Bay. The fort's existence was short-lived (gone by the time a Spanish defensive arrived in 1689) but had an important effect on Spain's perception of this territory in North America and their interest in maintaining proprietary control. Between 1690 and 1763 Spanish missions and their associated presidios were built all across the territory. Three missions/presidios were built along Spring Creek on land that is today part of Montgomery County, but these were abandoned in 1756. Nuestra Senora de La Luz Mission and San Agustin de Ahumada Presidio were constructed within the area of present-day Liberty County in 1756 and abandoned in 1772, as well as Nuestra Senora de la Luz Mission and San Augustin de Ahumada Presidio near present day Wallisville in Chambers County. A final French incursion was attempted by Napoleon loyalists in 1818 when Lallemand started a settlement near present day Anahuac in Chambers County. They were quickly displaced by the Spanish.

The nineteenth century found a change in the nature of the colonization threat to Spanish territorial claims in Texas. The 1803 Louisiana Purchase fueling the United States' land-hungry immigrants and the Mexican state's fight for independence (1810-1821) were the backdrop to Spain's attempt to maintain territorial boundaries by encouraging settlement by people loyal to Spain. Three separate requests were made of the Spanish government between 1812 and 1819, to allow the settlement of Texas by German soldiers and/or farmers, none of which reached fruition. Spain finally developed an empresario system in Texas which allowed for foreigners to enter into contractual agreement with Spain to respect its constitution and laws in return for permission for limited numbers of immigrants to settle specific tracts of land. The population of Texas at that time numbered fewer than 3000 people.

The first grant was given to Moses Austin, who became empresario of a tract of land between the Colorado and San Jacinto Rivers, including the majority of present day Harris County and western Montgomery County in south-central Texas. After Mexico gained its independence from Spain, Austin negotiated to maintain recognition of his empresario. The settlement was later increased with three more grants. Harrisburg was founded by John Richardson Harris who moved to Texas after meeting Moses Austin in 1823. The location on the San Jacinto River was fortuitous, as that river and its bayous "turned out to be the best transportation system in Texas" (Henson 2012). Harris built a house, store, and warehouse before having the town of Harrisburg laid out in 1826. When Harris died in 1829 the town and businesses became tied up in litigation over his estate, but "was a thriving port by 1831"

(Payne 2004:6). Andrew Montgomery settled and established a trading post in the area of the county that was to be established and named after him in 1837. Joseph Vehlein became an empresario with a grant given in 1821 over the land that is today Chambers and Liberty Counties. Perry's Point was the major Port of entry there and significant enough that the Mexican government, in 1825, renamed the town Anahuac, as part of its attempt to step up its presence in the region and maintain control in an area being settled by foreign immigrants.

By 1830, the influx of Anglo-American settlers reached levels high enough for the Mexican President to enact legislation preventing further immigration from the United States of America. At that time the Galveston Bay and Texas Land Company was formed to settle Europeans (especially Germans) in the area of south-central Texas, including the northwest quarter of present day Harris County. Fort Anahuac was built that year, and garrisoned by Mexican troops under Juan Davis Bradburn. Bradburn's attempts there to uphold Mexican law and enforce the collection of customs duties "helped precipitate the Texas Revolution" (Henson 2012) and a series of skirmishes occurred between 1831 and 1835, referred to as the Anahuac Disturbances. Later in 1835 settlements across Texas sent men to Gonzales to participate in the battle of Gonzales that began the Texas Revolution. Harrisburg contributed one third of its militia to the effort. The President and Vice President of the Republic of Texas were both from Harrisburg Municipality. The final battle of the revolution, the battle of San Jacinto, occurred in April of 1836 in Harrisburg Municipality six days after Santa Anna arrived in Harrisburg and burned the settlement.

4.2.1 Harris County

Harris County (named Harrisburg County until 1839) was formed in 1836, and Houston was named as the county seat at the same time. The first two German settlements in northwest Harris County were New Kentucky and Spring. New Kentucky was part of Austin's empresario, and was founded in the late 1820's by Abram Roberts. The town became a successful trade center, largely due to its convenient location at a crossroads between four prosperous towns. Due to competition with Houston, the town was abandoned around 1840. Spring was originally a municipality of Harrisburg, but its more direct origin was the William Pierpont trading post at Spring Creek in 1838. German families settled the area of Spring beginning in the 1840s and the town became an agricultural center. The railroad brought an industrial and urban boom to the town from 1871 until 1923, when Houston took over as home the major rail facilities in the region. The San Jacinto estuary continued to be an economic asset to the county: in 1911 the Harris County Ship Channel Navigation District was formed; the channel was widened and deepened in 1914; in 1918 petroleum refineries and other industries moved into the district. The area east of the San Jacinto River continued to rely on a largely agricultural economy with rice cultivation being the focus. Harris County became the most populous county in Texas in 1930, with over 350,000 residents. The population topped one million in 1960 and by 1990 was over 2.8 million with 1.6 million of those people residing in Houston. In the 2010 census, nearly 4.1 million residents were recorded in Harris County and Houston recorded 2.1 million residents.

4.2.2 Liberty County

Liberty County was established in 1836, with the town of Liberty as its county seat. The nineteenth century economy of the area relied heavily on plantations, lumber, shipping, and - after the introduction of longhorn cattle by James Taylor White in 1840 - livestock. Liberty County residents were Confederate sympathizers and 98% of the voting population voted for secession; troops were sent to join Confederate forces. After the war the white-black ratio remained around 50-50 through 1880, but thereafter dropped to the 66-33 range. Improvements along the Trinity River 1880 to 1940 made navigation for larger steamboats and ships more feasible, but railroad construction hurt the port economy in Liberty tremendously, becoming the major mode of transport by mid-twentieth century. The rice industry was regionally centered in Liberty County by 1900. Around that same time the oil boom arrived and the county has produced large amounts of oil and natural gas since that time, thus - like other surrounding counties - the nation-wide Great Depression was only moderately felt. After World War II, soybeans joined rice as primary in the economy of the agriculture industry and "the population in rural Liberty County grew approximately twice as fast as that in urban areas" (Kleiner 2012a).

4.2.3 Montgomery County

Montgomery County was established in 1837 out of the former Washington County, but reached its current reduced size in 1870 after the formation of five other counties. Antebellum Montgomery County drew its main economy from cotton plantations- in fact, in 1860 almost half the population of Montgomery County was enslaved people. Not surprisingly, the county's voting population sympathized with the Confederate States when the Civil War erupted and voted for secession. The loss of slave labor ruined the plantation agriculture industry, but after the war, when railroads were extended into and through Montgomery County, it was a chance to cash in on the extensive pine forests and lumber industries became the economic mainstay for forty years while "permanently altering the landscape and opening the way for a steady increase in livestock raising and farming" (Long 2012). The timber resources were decimated by 1930, when the Great Depression struck the United States and when the boll weevil infestations struck hard. Although one-third of tenant farmers lost their farms, Montgomery County was saved from the worse effects of the aforementioned combination of events by George William Strake. Strake was a wildcat oil driller, and he struck oil outside the town of Conroe in 1932. The benefits most widely felt were in the improvement of roads, schools, and municipal buildings and public parks as a result of the presence of the oil industry, which continues to this day as the leading source of income for the county's residents. Modern Montgomery County has seen population growth as a satellite community of Houston and suburban levels of development.

4.2.4 Chambers County

Chambers County was established in 1858, formed out of the former Liberty County, with Wallisville named as the county seat. Livestock was an early mainstay for the local economy. The county voted for secession and sent men to join Confederate forces. Slavery was not an essential part of the Chambers County economy, as it was in Montgomery County. In fact, the African-American population was approximately 500 in 1860, about one-third of the county population. Over half of the African-American population of Chambers County was free men, and at least 15 were landowners. The post-Civil War economy continued to depend on livestock, ranching especially. In 1870 a meatpacking plant opened in Wallisville, indicating the industry's strength. The lack of railroads through the county kept other industries from growing, but "general prosperity resulted in a near doubling of the population between 1880 and 1910" (Kleiner 2012b). Cattle population reached a climax at that time, as well. In 1908 the county seat was changed to Anahuac. An oil boom buffeted the county's population rise and stabilized economic levels after 1920, then continued to carry the county through the nation-wide Great Depression. Continual population growth, growth within the agricultural and oil industries remained the story for Chambers County clear to the present day.

4.3 Background Research

A review of historic maps was conducted during the survey, focusing on the Archaeological and Cultural Historic APEs. The USGS maps reviewed included the 1982 Forest 7.5 minute map; the 1922, 1950, and 1952 Forest 15 minute map; and the 1984 30x60 Forest minute map. Historic aerials were also examined, but they were not useful due to the scale of the maps.

4.3.1 Previous Surveys

A review of Texas Historic Commission, Texas shows that a total of 23 previous archaeological projects have been conducted within one km of the APE. Of these 23, nine (9) are linear archeological projects and fourteen (14) are archeological project areas. A summary of some of the more recent works are presented below.

In June and July, 2009, PBS&J archeologists conducted an archeological survey of the recommended alignment of Segment G of the Grand Parkway project in Harris and Montgomery counties. In 2002 and 2003 JBS&J had previously surveyed 115 hectares (ha) (284 acres [ac]). Since then, changes to the alignment required a survey of an additional 201.01 ha (496.71 ac). However, due to land owner access, only 83.5 ha (206.4 ac) was surveyed. No new sites were located but four previously recorded archeological sites, (41MQ197, 41MQ198, 41MQ199, and 41MQ225), were revisited. Site 41MQ197 was recommended for avoidance, site 41MQ198 was not within the study corridor, and the remaining two sites were recommended for no further archaeological investigations (Schubert and Bishop 2009).

Between July and October, 2008, Moore Archeological Consulting, Inc. developed and tested a predictive model for prehistoric settlement developed for the Lake Houston Park in Harris and Montgomery Counties, Texas. The model was based on the soils, topography and proximity to water. A reconnaissance level survey looked at approximately 200 acres (roughly 4 percent of the total park area) to test the model resulting in the discovery of 39 new prehistoric archaeological sites. As a result, the model was successful for identifying areas that contained prehistoric sites (Moore and Driver 2009).

In January, 2006, Ecological Communications Corporation conducted a Phase 1 archeologicaal survey of a 10.8 mile segment of SH 146 from US 90 in Dayton to the Chambers County line, in Liberty County. The project area was found to be located in an area that had a low geoarchaeological potential and had been extensively disturbed by activities associated with road and storm drainage construction. No cultural resources were located (Jones and Trierweiler 2006).

4.3.2 Previously Recorded Archaeological Sites

An examination for known archaeological site locations using the Texas Historical Commission's (THC) online Texas Archeological Sites Atlas revealed that there are three known sites within 1 km of the APE, all within Montgomery County. These three sites are: 41MQ425, 41MQ426, and 41MQ427. All three are located south of FM 1485 and were recorded by Moore Archeological Consulting in 2008 during a survey of Lake Houston Park. They are summarized in Table 4-1.

Site 41MQ245 is located 50m NW to unnamed tributary of Peach Creek on the Splendora Quadrangle. It is a late prehistoric open campsite with a neo-American presence. The artifacts consisted of a single silicified wood tertiary flake, a burned clay fragment, and a single Native American ceramic sherd fragment. The site is described as having scientific research value and deemed important to local prehistory. Further testing was recommended (Moore and Driver 2009).

Table 4-1. Known Archaeological Sites within one Kilometer of the APE.

Trinomial	Time Periods of Occupation	Artifactual Materials Present	Research Value	Further Investigations
41MQ245	Late Prehistoric Neo-American	1-silicified wood tertiary flake; 1-burned clay fragment; 1-Native American ceramic	This site has scientific research value and is important to local prehistory.	More shovel tests to better define the area.
41MQ246	Unknown Prehistoric	1-chert flake fragment	This site has scientific research value and is important to local prehistory.	More shovel tests to better define the area.
41MQ247	Unknown Prehistoric	1-chert secondary flake	This site has scientific research value and is important to local prehistory.	More shovel tests to better define the area.

Site 41MQ245is located 2360m at 94 degrees from the crossing of Peach Creek and FM 1485 2180m at 310 degrees from the confluence of Church House Gully and the East fork of the San Jacinto River 550m at 241 degrees from the crossing of Church House Gully and FM 1485, immediately South of Casey Pond (marsh), on the Splendora quadrangle. It is a prehistoric open campsite from an unidentified cultural affiliation. The artifacts consisted of a single chert flake fragment. The site is described as having scientific research value and deemed important to local prehistory. Further testing was recommended (Moore and Driver 2009).

Site 41MQ247is located 1415m at 90 degrees from the crossing of Peach Creek and FM 1485 1410m at 268 degrees from the crossing of Church House Gully and FM 1485 590m at 337 degrees from the North side of Creed Pond, 600m West to unnamed tributary of Peach Creek, on the Splendora quadrangle. It is a prehistoric open campsite from an unidentified cultural affiliation. The artifacts consisted of a single secondary chert flake. The site is described as having scientific research value and deemed important to local prehistory. Further testing was recommended (Moore and Driver 2009).

Section 5 - Artifact Descriptions

In this section the laboratory procedures and analytic methods are discussed and the materials recovered are presented. The analytic methods involve the use of an artifact classification scheme that creates useful analytic categories for evaluating National Register eligibility. The artifact assemblages are also discussed with the site descriptions and results in Section Six.

5.1 General Laboratory Procedures

Artifacts recovered during field investigations were brought to the WSA Archaeology Laboratory in Lexington, Kentucky, for cataloging and analysis. Materials were washed and sorted by general material type. The artifacts were then analyzed according to specific methods.

5.1.1 Analytical Methods: Prehistoric Artifact Assemblages

The analyses included tool analysis, raw material analysis, and mass analysis. These different techniques provide complementary data and permit the extrapolation of stronger inferences about the organization of lithic technology at the four sites. One hundred percent of all excavated materials were subjected to these, except where noted below.

All debitage was macroscopically examined for evidence of retouch and/or utilization. Those artifacts displaying retouch and/or utilization were then separated from non-utilized debitage. Additionally, all chipped stone artifacts were analyzed for presence of primary geologic or secondary incipient cone cortex and macroscopic evidence of thermal alteration. A typology of specimens was developed using standard techniques and definitions employed throughout eastern North America (e.g. Callahan 1979, Crabtree 1982, Odell 1996).

5.1.1.1 Bifaces

Bifaces are generalized bifacially flaked artifacts which may be blanks or preforms for morphologically distinct bifacial tools, or finished tools in their own right. Types of bifaces are based on technological attributes including flake scar patterns, edge sinuosity, width/thickness ratio, and edge angles. Callahan's biface production stages (1 through 5) are followed in this analysis (1979). Biface fragments include specimens too fragmentary to be placed in a stage according to the Callahan (1979) model.

5.1.1.1.1 Retouched Flakes

Retouched flakes are flake tools that contain evidence of modification, either a result of intentional retouching or chipping of the flake to form a certain kind of edge, surface, or shape, the result of tool use (wear), or both (Andrefsky 1998: 77-80). All debitage was examined for evidence of utilization by viewing the flake margins of each specimen with a 10 x magnifying hand lens. Specimens with microflake or retouch scars, edge polish, or other evidence of utilization along their margins were set aside for analysis and description. The retouched flakes where placed within the categories below.

5.1.1.1.2 Side Scrapers

Side scrapers have the working edge situated along the long edge or edges of a flake. Side scrapers sometimes have a scalene triangular transverse cross-section and sometimes are backed on the edge opposite the working edge. Natural backing is a flat flake scar positioned to provide a finger hold or haft.

5.1.1.1.3 End Scrapers

End scrapers have a steep working edge at one or both ends. Sometimes trapezoidal in shape, they are most frequently made on early stage flakes and use the dorsal ridges for added strength.

5.1.1.1.4 Spokeshaves

Spokeshaves are sometimes referred to as notched scrapers or concave scrapers because the working edge is located in a concavity on the perimeter of the flake. Concavities on flake edges can also be produced unintentionally by trampling, but this damage is often irregular, with small notches created in functionally inappropriate places.

5.1.1.1.5 Gravers

Gravers are modified isolated sharp, pointed projections on a flake. This tool probably functioned as a piercing or scoring tool. Graver spurs are nearly always manufactured to make use of natural flake ridges for added strength. Gravers are distinguished from natural projections by their modification, situation in a functionally appropriate position, and presence of a flake scar ridge leading to the spur.

5.1.1.1.6 Combination Tools

These tools contain two or more tool elements. The types of combination tools recovered include side scrapers containing with either gravers or spokeshaves.

5.1.1.2 Cores

A core consists of any piece of raw material from which flakes, blades, or bladelets have been intentionally removed. Cores can be embryonic, such as a piece of natural unprepared raw material with scars, reflecting the detachment of one or more flakes (Crabtree 1982: 30). Cores must exhibit at least one negative flake scar and a striking platform. Cortex may be retained over some of the surface, although this depends on the number of flakes or blades removed. The presence of primary geologic cortex may indicate that the raw material was procured from outcrops, whereas secondary incipient cone cortex on the core surface could suggest that raw material was procured from a stream context. Exhausted cores, (i.e., those too small for further reduction) may have been discarded at a site after use; cores still fit for reduction may also have been stored at a site for later use. The simplest forms of cores are described by the number of core platforms and whether the negative removals indicate blade or flake production.

A polyhedral core (amorphous core) contains opportunistically located striking platforms and a resultant randomly generated shape. The tendency to remove flakes along existing ridges in the material usually results in a globular form in exhausted cores. It is the most common core type as it is often the final attempt of a knapper to extract the last usable flakes from a piece of material. By definition it is irregular in shape and can have any number of remaining usable or abandoned striking platforms.

A core fragment consists of a portion of a core that exhibits at least one negative flake scar and striking platform, and one or more large-scale fresh fracture surfaces on one or several sides of the core. Core fragments are generally small in size and cannot be reliably assigned to any of the above categories.

5.1.1.3 Lithic Debitage

One of the most ubiquitous artifact categories on prehistoric sites is lithic debitage, which is considered to include all the material produced from the initial reduction stage to the use/reworking stage. Debitage is produced during all stages of reduction, but the representation of each class as compared to the other classes provides insight into the types of lithic use that occurred at a specific location. All flakes, blades, chunks/shatter were analyzed according to platform facet and dorsal scar counts, presence of cortex, and macroscopic evidence of thermal alteration and/or utilization.

Flakes are pieces of debitage with two faces, a dorsal and a ventral. The dorsal surface can be partly or totally covered by cortex, but normally shows the scars from removals that were made before the flake was removed from the core. The ventral surface contains only the features related to the detachment of the particular flake.

Flake debitage produced in bifacial and unifacial technologies is divided into three major categories including primary flakes, secondary flakes, and tertiary flakes, and several subcategories based on specific morphological attributes. These lithic reduction categories follow classification stages proposed by Collins (1974), Flenniken (1978), Boisvert et al. (1979), Magne and Pokotylo (1981), Magne (1985), Ebright (1987), and Bradbury and Carr (1995) with some modifications. A brief description of each debitage category is provided.

> *Primary flakes* (primary and secondary decortication flakes) are those produced during the earliest stages of lithic reduction and result from the removal of cortex from the raw material. *Primary decortication flakes* are usually large and cortex is present on over 50 percent of the dorsal surface. *Secondary decortication flakes* contain cortex on less than 50 percent of the dorsal surface.
>
> *Secondary flakes* (interior and thinning flakes) result from the reduction and shaping of the initial biface. Secondary flakes characteristically display a well-developed bulb of percussion, one or more flake scars on the dorsal surface, and may exhibit platform preparation. *Interior flakes* generally have large, double faceted platforms perpendicular to the orientation of the flake. *Thinning flakes* may have multi-faceted platforms at an acute or obtuse angle to the flake's orientation and may show signs of crushing or battering in preparation for flake removal from the parent material.
>
> *Tertiary flakes* (late stage percussion and pressure flakes) result from the sharpening and/or reworking of tools or points. These flakes are generally very small with small striking platforms, often multifaceted and steeply angled. Tertiary flakes are usually underrepresented in artifact assemblages recovered with standard ¼ inch hardware mesh screens, as these flakes are frequently smaller than ¼ inch and pass through the screens.

Flakes struck from flake cores for further unifacial modification are generally indistinguishable from those produced in bifacial reduction. However, a formal, specialized unifacial technology is blade manufacture, which produces morphologically distinct artifacts.

Blades are specialized flakes with more or less parallel or sub-parallel lateral edges which, when complete, are at least twice as long as wide (Owen 1982: 2). Blades contain at least one dorsal crest but may contain two or more dorsal crests. Blades are associated with prepared cores and blade technique and are not produced randomly (Crabtree 1982: 16).

Debitage displaying some flake characteristics are classified as *undetermined flakes* if they are too fragmentary to determine flaking stage.

Chunks/shatter are pieces of usable raw material with at least one freshly broken surface. Blocky and angular fragments are usually produced in the initial stages of flintknapping as a result of removing unstable areas of material from the core or blank. Chunks/shatter are distinguished from cores by the absence of negative flake scars and striking platforms. Natural processes may produce a small proportion of chunk/shatter.

5.1.1.4 Raw Material Analysis

The determination of raw material type was accomplished with the aid of written descriptions (Boisvert et al. 1979; Gatus 1980, 1982). All debitage and tools in the assemblage were macroscopically inspected to determine raw material type and compared with existing descriptions. The geologic quadrangle map was examined to determine the presence of chert-bearing geologic formations in the vicinity of the project area. Examining raw material procurement trends can yield data on settlement patterns, resource procurement strategies, and trade and exchange networks.

5.1.1.5 Mass Analysis

Mass analysis focuses on the variables of size, shape, and presence of cortex on aggregate batches of debitage as a means of distinguishing various forms and characteristics of reduction within a lithic artifact assemblage. Because there are several disadvantages in using reduction stage classification exclusively to analyze flaking debris, data obtained from mass analysis can be used to compare with those gained from reduction stage classification to provide more solid interpretations of the lithic artifact assemblage (Ahler and Christensen 1983, Ahler 1989, Bradbury and Franklin 2000). Two general theoretical observations regarding flintknapping underlie mass analysis and are relevant to the current study:

Flintknapping is fundamentally a reductive technology, and the nature of this technology places predictable and repetitive size constraints on the byproducts (and products) produced. Most flakes produced early in reduction should be larger, and most flakes produced late in reduction should be smaller. Similarly, the frequency of flakes with cortex should be highest in early reduction and lowest in late reduction.

Variation in load application in the flintknapping procedure produces corresponding variations in both size and flake shape. Experimental data shows that percussion flaking, on the whole, is capable of producing flakes much larger in size than any produced by pressure flaking. Size grade distribution data provides a fairly direct measure of load application variation (Ahler 1989: 89-91).

For this project, all non-utilized debitage (flakes, flake fragments) were passed through a series of nested laboratory hardware cloth screens to sort by size. Size grades follow Stahle and Dunn (1982, 1984). The size grades are as follows:

Grade 0 includes specimens smaller than ¼ inch
Grade 1 includes specimens smaller than ½ inch but larger than ¼ inch
Grade 2 includes specimens smaller than 1 inch but larger than ½ inch
Grade 3 includes specimens smaller than 2 inches but larger than 1 inch
Grade 4 includes specimens larger than 2 inches

Flake debris from each provenience in each grade was weighed as an aggregate to the nearest tenth of a gram and then counted. One attribute, thermal alteration, was also recorded for the reduction debris. Thermal alteration is often intentional within the culture in order to change the properties of the chert in order to make the raw material more adept to tool production.

The presence of primary geologic cortex may indicate that the raw material was procured from outcrops, whereas secondary incipient cone cortex on the core surface suggests that raw material was procured from a stream context. Research has shown that reduction analysis insufficiently provides data on the stage during which a flake was removed. However, by comparing frequency of occurrence of cortex on flakes, research indicates that a higher percentage of flakes during the initial stages of lithic reduction will have cortex and a lower percentage will have cortex during the final stages of lithic reduction. In addition, the amount of the flake covered in cortex is also an indicator of the stage during which the flake was removed, again more coverage indicates removal during the initial stages, and less coverage indicates later removal. Thus flakes with cortex were evaluated according to the following criteria:

Grade 1 includes specimens with primary geologic cortex over greater than 50% surface
Grade 2 includes specimens with primary geologic cortex over less than 50% surface
Grade 3 includes specimens with secondary conical cortex over greater than 50% surface
Grade 4 includes specimens with secondary conical cortex over less than 50% surface

All of these methods compose mass analysis. When taken together, they can provide extensive data on the methods of tool production.

5.1.1.6 Materials Recovered

Thirty-nine lithic artifacts were recovered, all from site 41MQ300 (Table 5-1and Table 5-2). All thirty-nine artifacts were debitage. Most of the debitage consisted of shatter, with two indeterminate flakes, and one biface reduction flake. The most common raw material was light gray chert with inclusions, followed by medium gray chert, and gray chert.

Table 5-1. Prehistoric Artifacts Recovered from Site 41MQ300.

Tool Type	Raw Material Type			Total
	Gray	Medium Gray	Light Gray w/Inclusions	
Debitage	11	13	15	39
Total	**11**	**13**	**15**	**39**

Table 5-2. Debitage Type by Size Grade from 41MQ300.

Debitage Type	Debitage Size Grade			Sub Total	Total
	1	2	3		
Biface Reduction	1			1	39
Intermediate Flake	2			2	
Shatter	31	4	1	36	
Total	**34**	**4**	**1**	**39**	

5.1.2 Analytical Methods: Historic Artifact Assemblages

Historic artifacts were cataloged according to the system of artifact-function association modified from South (1977). Since most if not all archaeologists initially classify artifacts with this functional system, results are comparable from state to state and region to region. All artifacts were assigned to the functional groups (e.g., kitchen, architecture), then to a material class (e.g., ceramic, glass, metal), then to a type (e.g., base of bottle, jar lip), and then to a subtype (e.g., color, decoration type). In the following discussion, each of the major categories of historic artifacts is defined. Table 5-3 shows the proportions of these various groups or artifact classes recovered from site 41MQ300.

Table 5-3. Historic Artifacts Recovered from Site 41MQ300.

Functional Group	Type	Total
Other	Wire	1
Total		**1**

5.1.2.1 Other Group

This category includes all materials that are not readily assignable to a major group. Items in this category include, for example, unidentified rusted metal artifacts and fragments of synthetic materials such as plastic, etc.

A total of one (1) artifact in this category was recovered during the survey from site 41MQ3001. It was a small fragment of metal wire.

CDM Smith

Section 6 - Synthesis, Evaluation, and Interpretation of Cultural Resources

This section presents the results of the intensive archaeological survey conducted for the Grand Parkway Association (GPA) for the proposed Grand Parkway Segments H and I-1 located in parts of Montgomery, Harris, Liberty, and Chambers counties.

6.1 Testing Results

Following the field methods presented in Section 3 and outlined in the *Antiquities Permit Application Form,* isolated parcels that had three acres or more within the APE had one STP excavated for every three acres. Isolated parcels with less than three acres inside the APE only had one STP excavated. When parcels fell adjacent to each other, they were viewed as one continuous parcel. Their combined acreage within the APE dictated if one or more STP was excavated.

Table 3.5 in Section 3 presents a summary of the areas tested and not tested. As a review, 33% of the APE was subjected to testing, 11% had previously been surveyed, and 56% was not tested. Summary tables are provided below for Montgomery (Table 6-1), Harris (Table 6-2), Liberty (Figure 6-9), and Chambers (Table 6-4) counties and are illustrated in Figure 6-1 through Figure 6-18. The tables identify which parcels were tested or not tested; for parcels where right of entry was granted, the testing methodology employed; if a parcel was to be tested but found to be untestable, the reason is provided; and lastly the figure number where the parcel is identified.

A total of 114 STP were excavated across the APE following the methodology outlined in Section 3. Their locations are shown in Figure 6-1 through Figure 6-18. All were negative for cultural material except for STP 51. An additional twelve (12) STPs were placed in the area of STP 51 to determine the depth, extent, and complexity of the site. The results of that investigation are present next in Section 6.2.1.

Table 6-1. Montgomery County Properties Test Status.

Tested/Not Tested	Status	Property Identification Number	Figure
Tested	Disturbed	R125184	Figure 6-3
Tested	Disturbed	R125223	Figure 6-3
Tested	Disturbed	R125224	Figure 6-3
Tested	Disturbed	R125226	Figure 6-3
Tested	Disturbed	R138035	Figure 6-3
Tested	Disturbed	R138037	Figure 6-3
Tested	Disturbed	R138038	Figure 6-3
Tested	Disturbed	R138039	Figure 6-3
Tested	Disturbed	R138041	Figure 6-3
Tested	Disturbed	R138042	Figure 6-3
Tested	Disturbed	R138043	Figure 6-3
Tested	Disturbed	R138044	Figure 6-3
Tested	Disturbed	R138045	Figure 6-3
Tested	Disturbed	R138056	Figure 6-3
Tested	Disturbed	R138057	Figure 6-3
Tested	Disturbed	R138059	Figure 6-3
Tested	Disturbed	R42051	Figure 6-3
Tested	Disturbed	R213720	Figure 6-3, Figure 6-2
Tested	Shovel Tested	R53888A	Figure 6-1
Tested	Shovel Tested	R233247	Figure 6-2
Tested	Shovel Tested	R52601	Figure 6-2
Tested	Shovel Tested	R52618	Figure 6-2
Tested	Shovel Tested	R52646	Figure 6-2
Tested	Shovel Tested	R52670	Figure 6-2
Tested	Shovel Tested	R70855	Figure 6-2
Tested	Shovel Tested	R70856	Figure 6-2
Tested	Shovel Tested	R70862	Figure 6-2
Tested	Shovel Tested	R225083	Figure 6-2, Figure 6-1
Tested	Shovel Tested	R53888B	Figure 6-2, Figure 6-1
Tested	Shovel Tested	R125125	Figure 6-3
Tested	Shovel Tested	R125126	Figure 6-3
Tested	Shovel Tested	R125152	Figure 6-3
Tested	Shovel Tested	R125153	Figure 6-3
Tested	Shovel Tested	R125155	Figure 6-3
Tested	Shovel Tested	R125157	Figure 6-3

Tested/Not Tested	Status	Property Identification Number	Figure
Tested	Shovel Tested	R125167	Figure 6-3
Tested	Shovel Tested	R125168	Figure 6-3
Tested	Shovel Tested	R138031	Figure 6-3
Tested	Shovel Tested	R138032	Figure 6-3
Tested	Shovel Tested	R138033	Figure 6-3
Tested	Shovel Tested	R138049	Figure 6-3
Tested	Shovel Tested	R138050	Figure 6-3
Tested	Shovel Tested	R163246	Figure 6-3
Tested	Shovel Tested	R163247	Figure 6-3
Tested	Shovel Tested	R163259	Figure 6-3
Tested	Shovel Tested	R163260	Figure 6-3
Tested	Shovel Tested	R230102	Figure 6-3
Tested	Shovel Tested	R253667	Figure 6-3
Tested	Shovel Tested	R269882	Figure 6-3
Tested	Shovel Tested	R42058	Figure 6-3
Tested	Shovel Tested	R42062	Figure 6-3
Tested	Shovel Tested	R42064	Figure 6-3
Tested	Shovel Tested	R42068	Figure 6-3
Tested	Shovel Tested	R42069	Figure 6-3
Tested	Shovel Tested	R42107	Figure 6-3
Tested	Shovel Tested	R42130	Figure 6-3
Tested	Shovel Tested	R42138	Figure 6-3
Tested	Shovel Tested	R42139	Figure 6-3
Tested	Shovel Tested	R42140	Figure 6-3
Tested	Shovel Tested	R42145	Figure 6-3
Tested	Shovel Tested	R52617	Figure 6-3, Figure 6-2
Tested	Shovel Tested	R108183	Figure 6-4
Tested	Shovel Tested	R108187	Figure 6-4
Tested	Shovel Tested	R108188	Figure 6-4
Tested	Shovel Tested	R108189	Figure 6-4
Tested	Shovel Tested	R108190	Figure 6-4
Tested	Shovel Tested	R42091	Figure 6-4
Tested	Shovel Tested	R42097	Figure 6-4
Tested	Shovel Tested	R42158	Figure 6-4
Tested	Shovel Tested	R58659	Figure 6-4
Tested	Shovel Tested	R58661	Figure 6-4
Tested	Shovel Tested	R42081	Figure 6-4, Figure 6-3

Tested/Not Tested	Status	Property Identification Number	Figure
Tested	Shovel Tested	R77386	Figure 6-4, Figure 6-3
Tested	Shovel Tested	R77387	Figure 6-4, Figure 6-3
Not Tested	Could Not Contact Landowner	R52642	Figure 6-2
Not Tested	Not Tested	R128883	Figure 6-1
Not Tested	Not Tested	R128884	Figure 6-1
Not Tested	Not Tested	99999a	Figure 6-2
Not Tested	Not Tested	99999a	Figure 6-2
Not Tested	Not Tested	R144429	Figure 6-2
Not Tested	Not Tested	R243168	Figure 6-2
Not Tested	Not Tested	R52540	Figure 6-2
Not Tested	Not Tested	R52667	Figure 6-2
Not Tested	Not Tested	R52679	Figure 6-2
Not Tested	Not Tested	R52680	Figure 6-2
Not Tested	Not Tested	R52681	Figure 6-2
Not Tested	Not Tested	R52682	Figure 6-2
Not Tested	Not Tested	R70824	Figure 6-2
Not Tested	Not Tested	R70826	Figure 6-2
Not Tested	Not Tested	R70851	Figure 6-2
Not Tested	Not Tested	R70854	Figure 6-2
Not Tested	Not Tested	99999b	Figure 6-3
Not Tested	Not Tested	R125128	Figure 6-3
Not Tested	Not Tested	R125169	Figure 6-3
Not Tested	Not Tested	R125170	Figure 6-3
Not Tested	Not Tested	R125186	Figure 6-3
Not Tested	Not Tested	R125187	Figure 6-3
Not Tested	Not Tested	R125188	Figure 6-3
Not Tested	Not Tested	R125200	Figure 6-3
Not Tested	Not Tested	R125201	Figure 6-3
Not Tested	Not Tested	R125202	Figure 6-3
Not Tested	Not Tested	R125225	Figure 6-3
Not Tested	Not Tested	R138034	Figure 6-3
Not Tested	Not Tested	R138040	Figure 6-3
Not Tested	Not Tested	R138046	Figure 6-3
Not Tested	Not Tested	R138053	Figure 6-3
Not Tested	Not Tested	R163245	Figure 6-3
Not Tested	Not Tested	R222169	Figure 6-3
Not Tested	Not Tested	R236994	Figure 6-3

Tested/Not Tested	Status	Property Identification Number	Figure
Not Tested	Not Tested	R42044A	Figure 6-3
Not Tested	Not Tested	R42044B	Figure 6-3
Not Tested	Not Tested	R42045	Figure 6-3
Not Tested	Not Tested	R42046B	Figure 6-3
Not Tested	Not Tested	R42067	Figure 6-3
Not Tested	Not Tested	R42070	Figure 6-3
Not Tested	Not Tested	R42073	Figure 6-3
Not Tested	Not Tested	R42074	Figure 6-3
Not Tested	Not Tested	R42075	Figure 6-3
Not Tested	Not Tested	R42126	Figure 6-3
Not Tested	Not Tested	R42131	Figure 6-3
Not Tested	Not Tested	R42134	Figure 6-3
Not Tested	Not Tested	R42136	Figure 6-3
Not Tested	Not Tested	R42161	Figure 6-3
Not Tested	Not Tested	R42046A	Figure 6-3, Figure 6-2
Not Tested	Not Tested	R42046A	Figure 6-3, Figure 6-2
Not Tested	Not Tested	R52665	Figure 6-3, Figure 6-2
Not Tested	Not Tested	R42092	Figure 6-4
Not Tested	Not Tested	R42092	Figure 6-4
Not Tested	Not Tested	R42094	Figure 6-4
Not Tested	Not Tested	R42096	Figure 6-4
Not Tested	Not Tested	R42137	Figure 6-4
Not Tested	Not Tested	R69387	Figure 6-4
Not Tested	Not Tested	R69391	Figure 6-4
Not Tested	Not Tested	R69392	Figure 6-4
Not Tested	Not Tested	R42082	Figure 6-4, Figure 6-3
Not Tested	Not Tested	R42084	Figure 6-4, Figure 6-3
Not Tested	Not Tested	R42085	Figure 6-4, Figure 6-3
Not Tested	Not Tested	R42118	Figure 6-4, Figure 6-3
Not Tested	Not Tested	R42046	Figure 6-4, Figure 6-3, Figure 6-2
Not Tested	Previously Surveyed	R53888A	Figure 6-1
Not Tested	Radiation Warning	R261644	Figure 6-2
Not Tested	Radiation Warning	R52618	Figure 6-2
Not Tested	Radiation Warning	R52647	Figure 6-2
Not Tested	Slope	R225083	Figure 6-2, Figure 6-1

Table 6-2. Harris County Properties Test Status.

Tested/Not Tested	Status	Property Identification Number	Figure
Tested	Disturbed	0432250000002	Figure 6-4
Tested	Shovel Tested	0432250000021	Figure 6-4
Not Tested	Not Tested	0432250000001	Figure 6-4
Not Tested	Not Tested	0432250000003	Figure 6-4
Not Tested	Not Tested	0432250000006	Figure 6-5, Figure 6-4
Not Tested	Not Tested	0432250000008	Figure 6-5
Not Tested	Not Tested	0432250000020	Figure 6-4
Not Tested	Not Tested	0432250000021	Figure 6-4

Table 6-3. Liberty County Properties Test Status.

Tested/Not Tested	Status	Property Identification Number	Figure
Tested	Disturbed	19973	Figure 6-16
Tested	Disturbed	19973	Figure 6-16
Tested	Disturbed	25381	Figure 6-8
Tested	Disturbed	25386	Figure 6-8
Tested	Disturbed	102064	Figure 6-8
Tested	Disturbed	214056	Figure 6-8
Tested	Disturbed	214065	Figure 6-8
Tested	Shovel Tested	214067	Figure 6-8
Tested	Shovel Tested	214071	Figure 6-8
Tested	Disturbed	53693	Figure 6-8, Figure 6-9
Tested	Shovel Tested	136678	Figure 6-8, Figure 6-9
Tested	Shovel Tested	30328	Figure 6-9
Tested	Shovel Tested	32825	Figure 6-9
Tested	Shovel Tested	32825	Figure 6-9
Tested	Shovel Tested	32825	Figure 6-9
Tested	Disturbed	152975	Figure 6-9
Tested	Shovel Tested	168774	Figure 6-9
Tested	Shovel Tested	172581	Figure 6-9
Tested	Shovel Tested	176630	Figure 6-9
Tested	Disturbed	25251	Figure 6-9, Figure 6-10
Tested	Disturbed	25257	Figure 6-9, Figure 6-10
Tested	Shovel Tested	30203	Figure 6-10
Tested	Surface Collection	69492	Figure 6-10
Tested	Shovel Tested	141245	Figure 6-10, Figure 6-11
Tested	Shovel Tested	69467	Figure 6-11

Tested/Not Tested	Status	Property Identification Number	Figure
Tested	Shovel Tested	69479	Figure 6-11
Tested	Shovel Tested	69481	Figure 6-11
Tested	Shovel Tested	69482	Figure 6-11
Tested	Shovel Tested	69555	Figure 6-11
Tested	Shovel Tested	134423	Figure 6-11
Tested	Shovel Tested	136736	Figure 6-11
Tested	Shovel Tested	137350	Figure 6-11
Tested	Shovel Tested	69566	Figure 6-11, Figure 6-12
Tested	Surface Collection	69489	Figure 6-11
Tested	Surface Collection	69571	Figure 6-12
Tested	Surface Collection	69571	Figure 6-12
Tested	Surface Collection	69571	Figure 6-12
Tested	Surface Collection	69571	Figure 6-12
Tested	Surface Collection	10024	Figure 6-13
Tested	Surface Collection	17104	Figure 6-13, Figure 6-14, Figure 6-15
Tested	Surface Collection	17104	Figure 6-13, Figure 6-14, Figure 6-15
Tested	Disturbed	17104	Figure 6-13, Figure 6-14, Figure 6-15
Tested	Surface Collection	104025	Figure 6-15
Tested	Surface Collection	104025	Figure 6-15
Not Tested	Not Tested	26716	Figure 6-5
Not Tested	Not Tested	29668	Figure 6-5, Figure 6-6
Not Tested	Not Tested	31635	Figure 6-5, Figure 6-6
Not Tested	Not Tested	30769	Figure 6-6
Not Tested	Not Tested	26617	Figure 6-6, Figure 6-7
Not Tested	Not Tested	28559	Figure 6-6, Figure 6-7
Not Tested	Previously Surveyed	15703	Figure 6-7
Not Tested	Previously Surveyed	15703	Figure 6-7
Not Tested	Not Tested	15703	Figure 6-7
Not Tested	Not Tested	15710	Figure 6-7
Not Tested	Not Tested	28559	Figure 6-7
Not Tested	Not Tested	177030	Figure 6-7
Not Tested	Not Tested	177032	Figure 6-7
Not Tested	Not Tested	15702	Figure 6-7, Figure 6-8
Not Tested	Not Tested	15703	Figure 6-7, Figure 6-8
Not Tested	Previously Surveyed	15703	Figure 6-7, Figure 6-8
Not Tested	Not Tested	31028	Figure 6-7, Figure 6-8
Not Tested	Not Tested	29897	Figure 6-8
Not Tested	Not Tested	29901	Figure 6-8

Tested/Not Tested	Status	Property Identification Number	Figure
Not Tested	Not Tested	29915	Figure 6-8
Not Tested	Not Tested	102052	Figure 6-8
Not Tested	Not Tested	214065	Figure 6-8
Not Tested	Not Tested	214066	Figure 6-8
Not Tested	Not Tested	214068	Figure 6-8
Not Tested	Not Tested	214069	Figure 6-8
Not Tested	Not Tested	214070	Figure 6-8
Not Tested	Not Tested	214072	Figure 6-8
Not Tested	Not Tested	30318	Figure 6-8, Figure 6-9
Not Tested	Not Tested	30333	Figure 6-8, Figure 6-9
Not Tested	Not Tested	30334	Figure 6-8, Figure 6-9
Not Tested	Not Tested	53686	Figure 6-8, Figure 6-9
Not Tested	Not Tested	53686	Figure 6-8, Figure 6-9
Not Tested	Not Tested	53686	Figure 6-8, Figure 6-9
Not Tested	Not Tested	53686	Figure 6-8, Figure 6-9
Not Tested	Not Tested	53686	Figure 6-8, Figure 6-9
Not Tested	Not Tested	53686	Figure 6-8, Figure 6-9
Not Tested	Not Tested	108080	Figure 6-8, Figure 6-9
Not Tested	Not Tested	25413	Figure 6-9
Not Tested	Not Tested	25414	Figure 6-9
Not Tested	Not Tested	30273	Figure 6-9
Not Tested	Not Tested	30318	Figure 6-9
Not Tested	Not Tested	30336	Figure 6-9
Not Tested	Not Tested	30337	Figure 6-9
Not Tested	Not Tested	30350	Figure 6-9
Not Tested	Not Tested	53686	Figure 6-9
Not Tested	Not Tested	53686	Figure 6-9
Not Tested	Not Tested	53686	Figure 6-9
Not Tested	Not Tested	53686	Figure 6-9
Not Tested	Not Tested	53686	Figure 6-9
Not Tested	Not Tested	53686	Figure 6-9
Not Tested	Not Tested	53686	Figure 6-9
Not Tested	Not Tested	53686	Figure 6-9
Not Tested	Not Tested	53686	Figure 6-9
Not Tested	Not Tested	152973	Figure 6-9
Not Tested	Not Tested	172041	Figure 6-9
Not Tested	Not Tested	172497	Figure 6-9
Not Tested	Not Tested	172498	Figure 6-9

Tested/Not Tested	Status	Property Identification Number	Figure
Not Tested	Entry Denied	173059	Figure 6-9
Not Tested	Not Tested	176832	Figure 6-9
Not Tested	Not Tested	179618	Figure 6-9
Not Tested	Not Tested	153765	Figure 6-9, Figure 6-10
Not Tested	Not Tested	167683	Figure 6-9, Figure 6-10
Not Tested	Not Tested	169053	Figure 6-9, Figure 6-10
Not Tested	Not Tested	25200	Figure 6-10
Not Tested	Not Tested	30206	Figure 6-10
Not Tested	Not Tested	30230	Figure 6-10
Not Tested	Not Tested	69492	Figure 6-10
Not Tested	Not Tested	69502	Figure 6-10
Not Tested	Not Tested	102327	Figure 6-10
Not Tested	Not Tested	102327	Figure 6-10
Not Tested	Not Tested	102327	Figure 6-10
Not Tested	Not Tested	113472	Figure 6-10
Not Tested	Not Tested	121732	Figure 6-10
Not Tested	Not Tested	121732	Figure 6-10
Not Tested	Not Tested	128292	Figure 6-10
Not Tested	Not Tested	128292	Figure 6-10
Not Tested	Not Tested	69502	Figure 6-10, Figure 6-11
Not Tested	Not Tested	69502	Figure 6-10, Figure 6-11
Not Tested	Not Tested	69474	Figure 6-11
Not Tested	Not Tested	69474	Figure 6-11
Not Tested	Not Tested	69491	Figure 6-11
Not Tested	Not Tested	69553	Figure 6-11
Not Tested	Not Tested	69553	Figure 6-11
Not Tested	Not Tested	69557	Figure 6-11
Not Tested	Not Tested	69557	Figure 6-11
Not Tested	Not Tested	69557	Figure 6-11
Not Tested	Not Tested	69558	Figure 6-11
Not Tested	Not Tested	69558	Figure 6-11
Not Tested	Not Tested	69560	Figure 6-11
Not Tested	Not Tested	69562	Figure 6-11
Not Tested	Not Tested	120208	Figure 6-11
Not Tested	Not Tested	134420	Figure 6-11
Not Tested	Not Tested	134421	Figure 6-11
Not Tested	Not Tested	134422	Figure 6-11
Not Tested	Not Tested	134424	Figure 6-11

Tested/Not Tested	Status	Property Identification Number	Figure
Not Tested	Not Tested	134425	Figure 6-11
Not Tested	Not Tested	134426	Figure 6-11
Not Tested	Not Tested	134427	Figure 6-11
Not Tested	Not Tested	134428	Figure 6-11
Not Tested	Not Tested	134429	Figure 6-11
Not Tested	Not Tested	134430	Figure 6-11
Not Tested	Not Tested	134431	Figure 6-11
Not Tested	Not Tested	134463	Figure 6-11
Not Tested	Not Tested	134465	Figure 6-11
Not Tested	Not Tested	134466	Figure 6-11
Not Tested	Not Tested	134467	Figure 6-11
Not Tested	Not Tested	137357	Figure 6-11
Not Tested	Not Tested	142388	Figure 6-11
Not Tested	Not Tested	135967	Figure 6-11, Figure 6-12
Not Tested	Entry Denied	201060	Figure 6-11, Figure 6-12
Not Tested	Entry Denied	201060	Figure 6-12
Not Tested	Entry Denied	201060	Figure 6-12
Not Tested	Entry Denied	201190	Figure 6-12
Not Tested	Not Tested	167361	Figure 6-12
Not Tested	Not Tested	169019	Figure 6-12, Figure 6-13
Not Tested	Not Tested	17098	Figure 6-14
Not Tested	Not Tested	17098	Figure 6-14
Not Tested	Not Tested	30950	Figure 6-15
Not Tested	Not Tested	30950	Figure 6-15
Not Tested	Not Tested	30952	Figure 6-15
Not Tested	Entry Denied	28413	Figure 6-15
Not Tested	Previously Surveyed	31155	Figure 6-15, Figure 6-16
Not Tested	Previously Surveyed	31810	Figure 6-15, Figure 6-16
Not Tested	Entry Denied	31810	Figure 6-15, Figure 6-16
Not Tested	Entry Denied	30985	Figure 6-16
Not Tested	Not Tested	30986	Figure 6-16
Not Tested	Entry Denied	31311	Figure 6-16
Not Tested	Not Tested	31312	Figure 6-16
Not Tested	Entry Denied	167729	Figure 6-16
Not Tested	Entry Denied	167732	Figure 6-16
Not Tested	Not Tested	109302	Figure 6-16
Not Tested	Not Tested	167728	Figure 6-16
Not Tested	Not Tested	167731	Figure 6-16

Tested/Not Tested	Status	Property Identification Number	Figure
Not Tested	Previously Surveyed	28413	Figure 6-16
Not Tested	Previously Surveyed	19973	Figure 6-16
Not Tested	Previously Surveyed	167729	Figure 6-16
Not Tested	Previously Surveyed	167732	Figure 6-16

Table 6-4. Chambers County Properties Test Status.

Test/Not Tested	Status	Property Identification Number	Figure
Tested	Shovel Tested	1160	Figure 6-17
Tested	Shovel Tested	19689	Figure 6-17
Tested	Shovel Tested	32611	Figure 6-17
Tested	Shovel Tested	43460	Figure 6-17
Tested	Shovel Tested	43462	Figure 6-17
Tested	Shovel Tested	43462	Figure 6-17
Tested	Shovel Tested	43471	Figure 6-17
Tested	Shovel Tested	50530	Figure 6-17
Tested	Shovel Tested	14404	Figure 6-18
Tested	Surface Collection	14404	Figure 6-18
Tested	Shovel Tested	14405	Figure 6-18
Tested	Shovel Tested	14411	Figure 6-18
Tested	Shovel Tested	14414	Figure 6-18
Tested	Surface Collection	23478	Figure 6-18
Tested	Shovel Tested	44773	Figure 6-18
Tested	Surface Collection	44773	Figure 6-18
Not Tested	Entry Denied	1878	Figure 6-16
Not Tested	Not Tested	4715	Figure 6-16
Not Tested	Previously Surveyed	4715	Figure 6-16
Not Tested	Previously Surveyed	4715	Figure 6-16
Not Tested	Not Tested	4724	Figure 6-16
Not Tested	Not Tested	4724	Figure 6-16
Not Tested	Previously Surveyed	4724	Figure 6-16
Not Tested	Previously Surveyed	4724	Figure 6-16
Not Tested	Not Tested	5910	Figure 6-16
Not Tested	Previously Surveyed	5910	Figure 6-16
Not Tested	Could Not Contact	13234	Figure 6-16
Not Tested	Could Not Contact	13234	Figure 6-16
Not Tested	Not Tested	17107	Figure 6-16
Not Tested	Previously Surveyed	17107	Figure 6-16

Test/Not Tested	Status	Property Identification Number	Figure
Not Tested	Previously Surveyed	17107	Figure 6-16
Not Tested	Not Tested	20582	Figure 6-16
Not Tested	Not Tested	20582	Figure 6-16
Not Tested	Previously Surveyed	20582	Figure 6-16
Not Tested	Previously Surveyed	20582	Figure 6-16
Not Tested	Previously Surveyed	20582	Figure 6-16
Not Tested	Not Tested	21415	Figure 6-16
Not Tested	Previously Surveyed	21415	Figure 6-16
Not Tested	Not Tested	27619	Figure 6-16
Not Tested	Not Tested	36261	Figure 6-16
Not Tested	Previously Surveyed	36261	Figure 6-16
Not Tested	Previously Surveyed	36262	Figure 6-16
Not Tested	Not Tested	1161	Figure 6-17
Not Tested	Not Tested	1169	Figure 6-17
Not Tested	Not Tested	1169	Figure 6-17
Not Tested	Not Tested	1169	Figure 6-17
Not Tested	Previously Surveyed	1169	Figure 6-17
Not Tested	Previously Surveyed	1169	Figure 6-17
Not Tested	Not Tested	5049	Figure 6-17
Not Tested	Not Tested	9233	Figure 6-17
Not Tested	Previously Surveyed	9233	Figure 6-17
Not Tested	Could Not Contact	13233	Figure 6-17
Not Tested	Previously Surveyed	13233	Figure 6-17
Not Tested	Previously Surveyed	13233	Figure 6-17
Not Tested	Previously Surveyed	13233	Figure 6-17
Not Tested	Not Tested	20512	Figure 6-17
Not Tested	Previously Surveyed	20512	Figure 6-17
Not Tested	Previously Surveyed	20512	Figure 6-17
Not Tested	Previously Surveyed	20539	Figure 6-17
Not Tested	Previously Surveyed	29505	Figure 6-17
Not Tested	Not Tested	29663	Figure 6-17
Not Tested	Previously Surveyed	43462	Figure 6-17
Not Tested	Entry Denied	43601	Figure 6-17
Not Tested	Previously Surveyed	50530	Figure 6-17
Not Tested	Not Tested	11375	Figure 6-18
Not Tested	Not Tested	11376	Figure 6-18
Not Tested	Not Tested	16226	Figure 6-18
Not Tested	Not Tested	28178	Figure 6-18

Test/Not Tested	Status	Property Identification Number	Figure
Not Tested	Not Tested	28179	Figure 6-18
Not Tested	Not Tested	29158	Figure 6-18
Not Tested	Not Tested	5048	Figure 6-17, Figure 6-18
Not Tested	Not Tested	19091	Figure 6-17, Figure 6-18

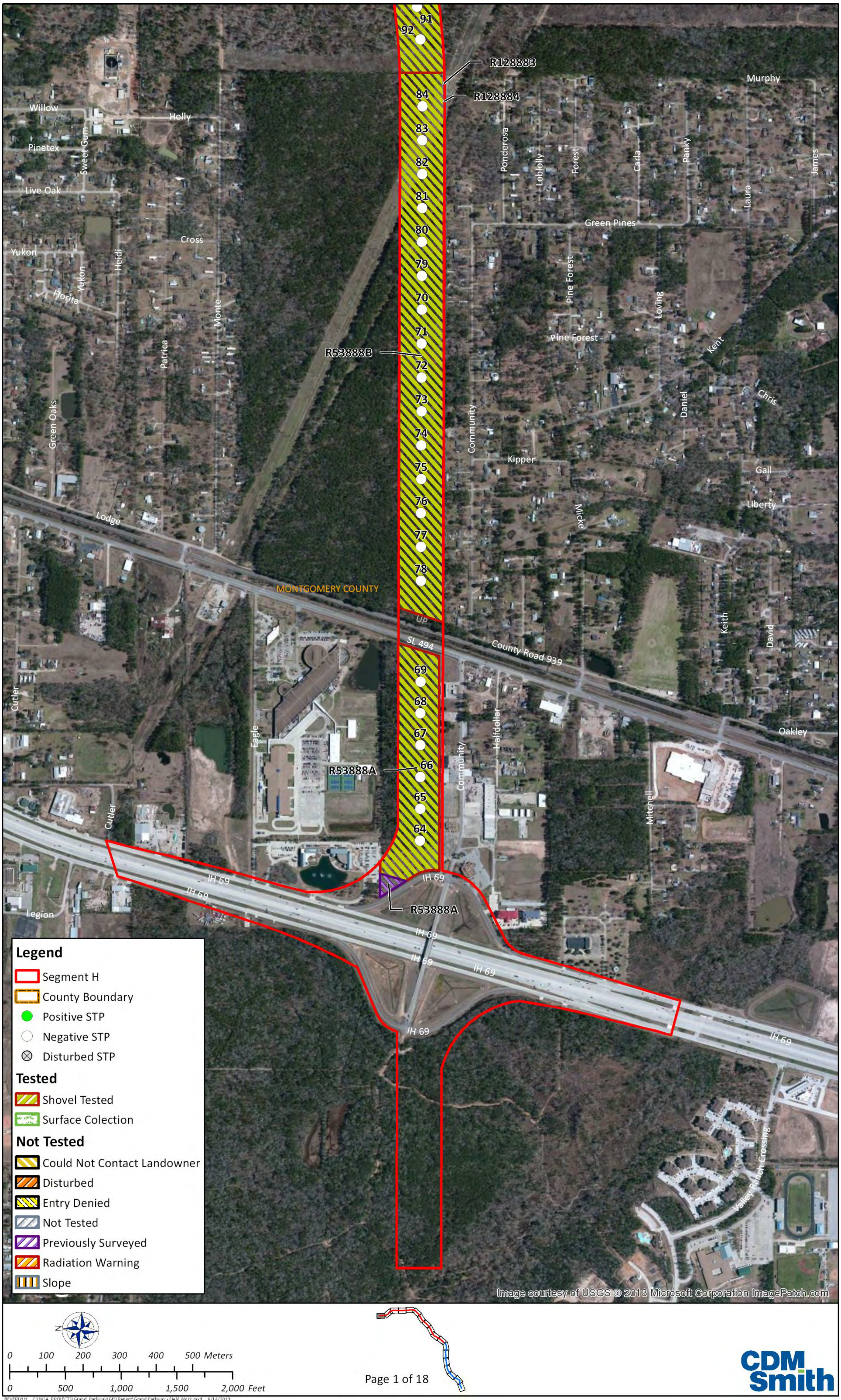


Figure 6-1. Test Status, Sheet 1 of 18.

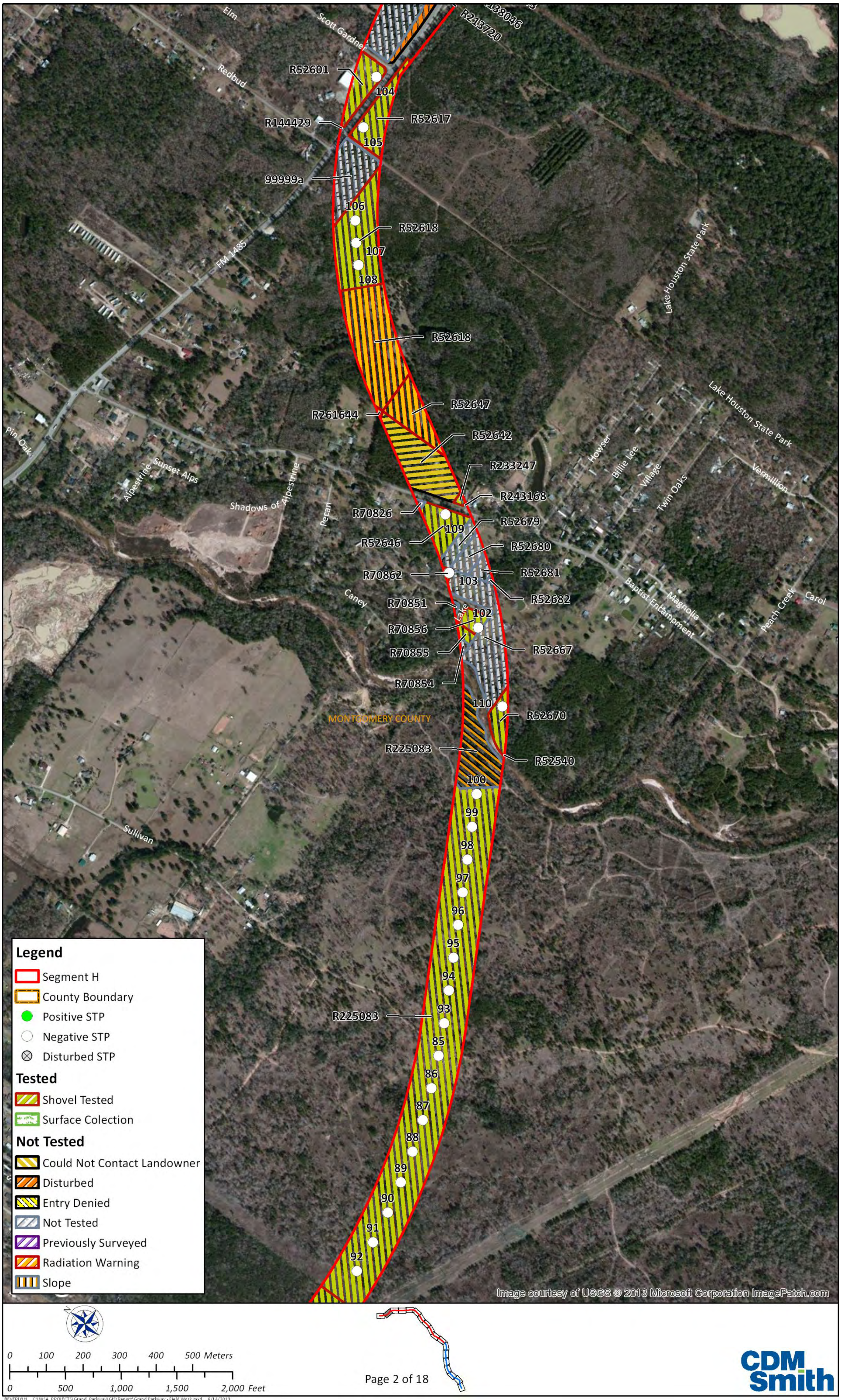


Figure 6-2. Test Status, Sheet 2 of 18.

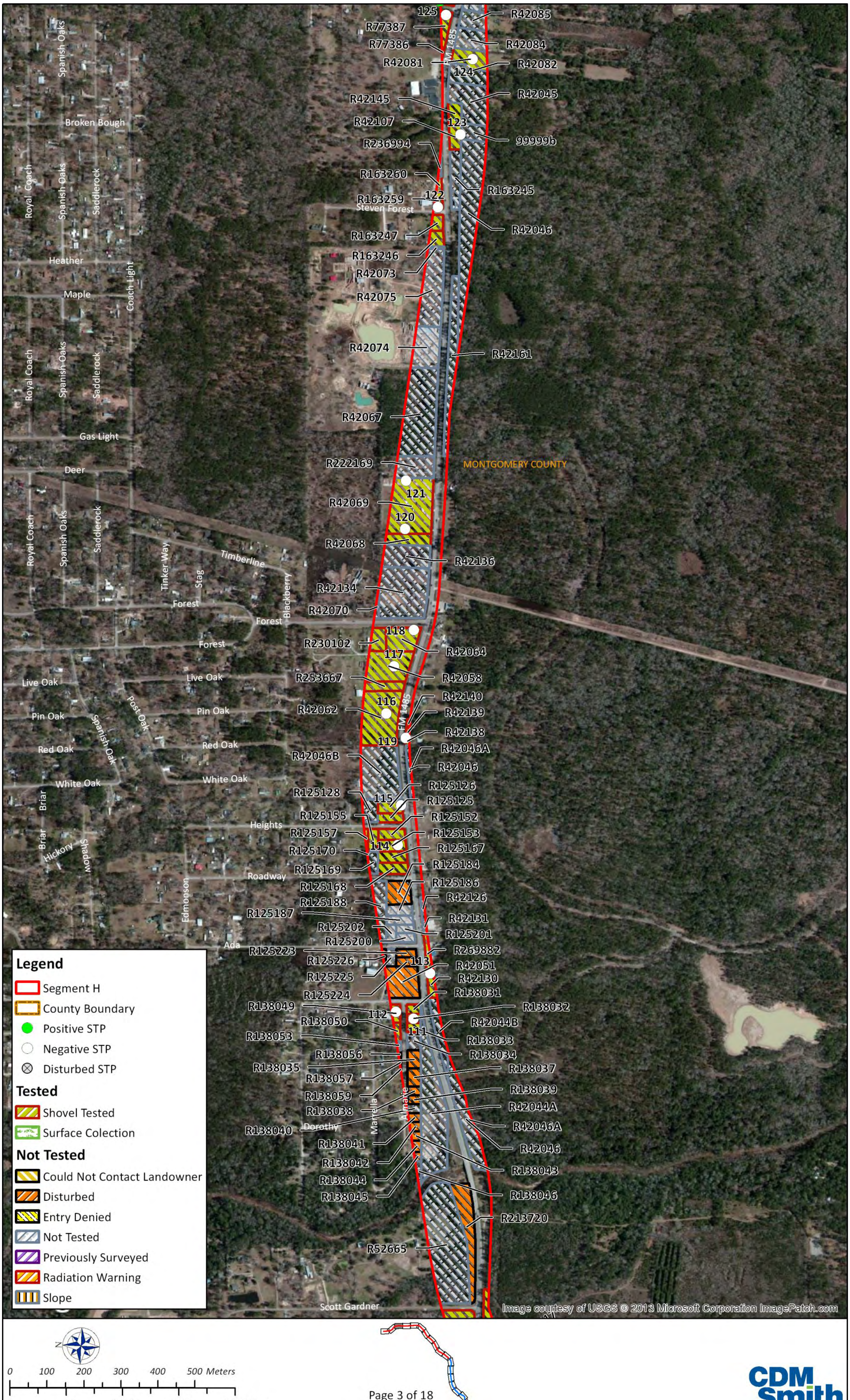


Figure 6-3. Test Status, Sheet 3 of 18.

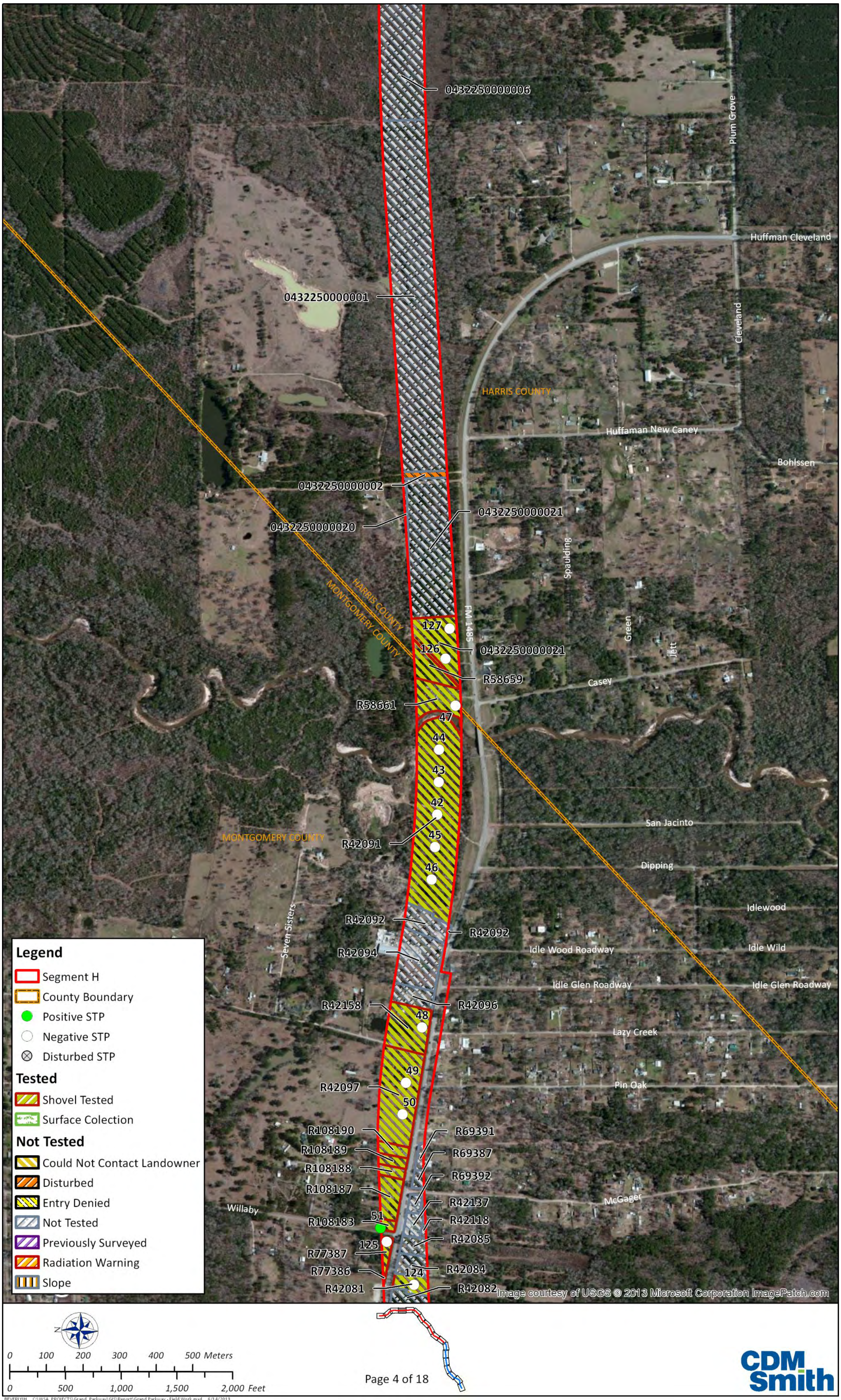


Figure 6-4. Test Status, Sheet 4 of 18.

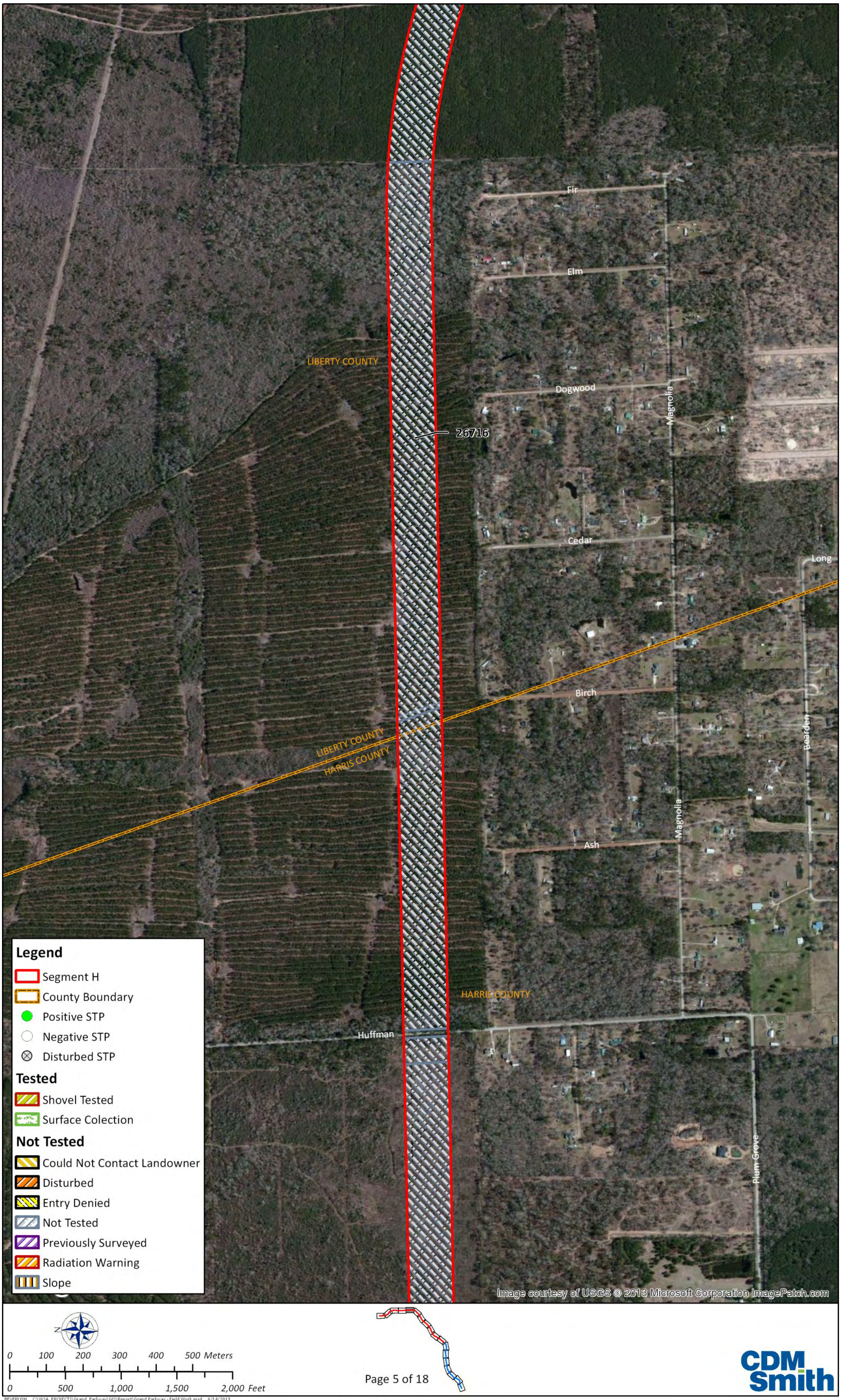


Figure 6-5. Test Status, Sheet 5 of 18.

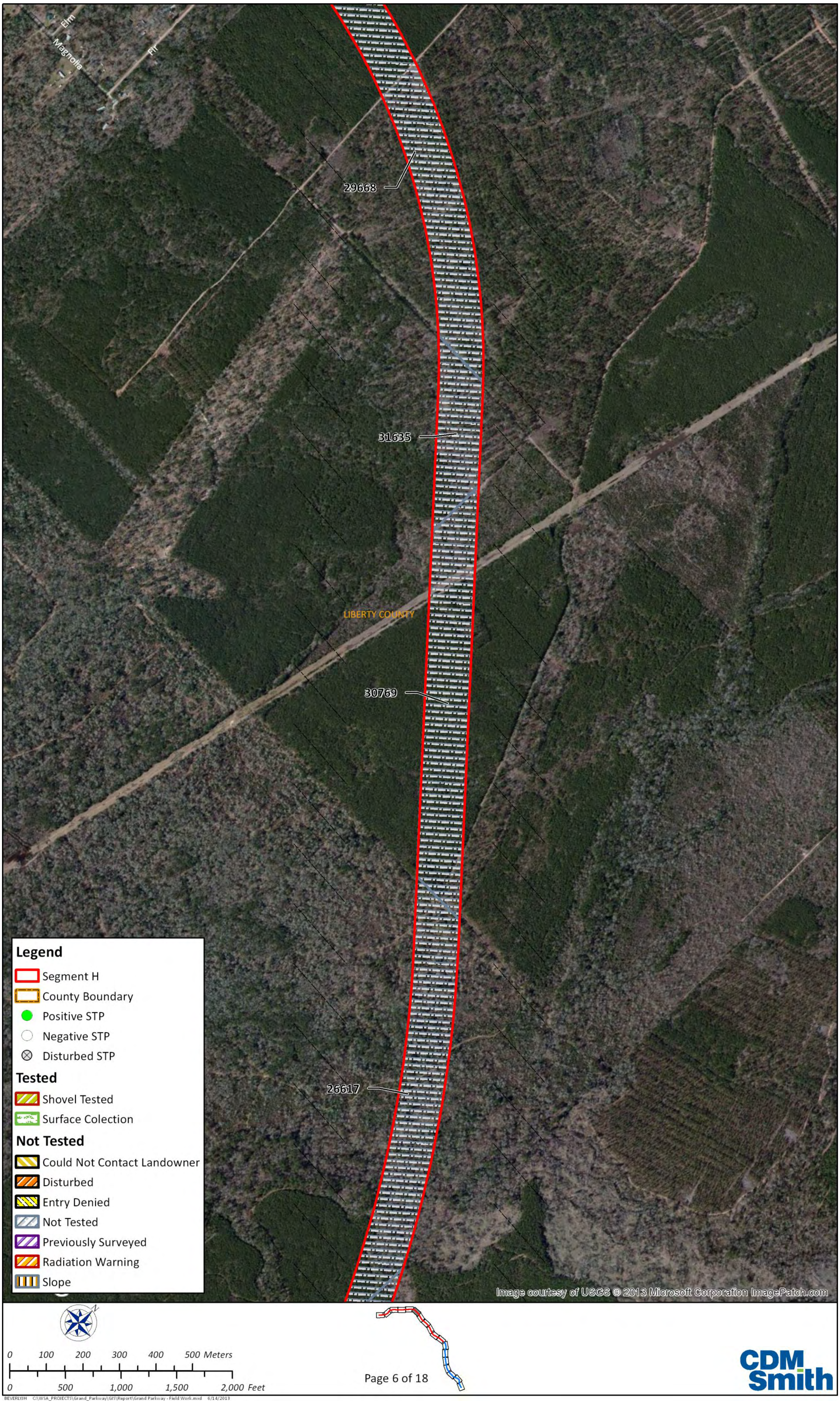


Figure 6-6. Test Status, Sheet 6 of 18.

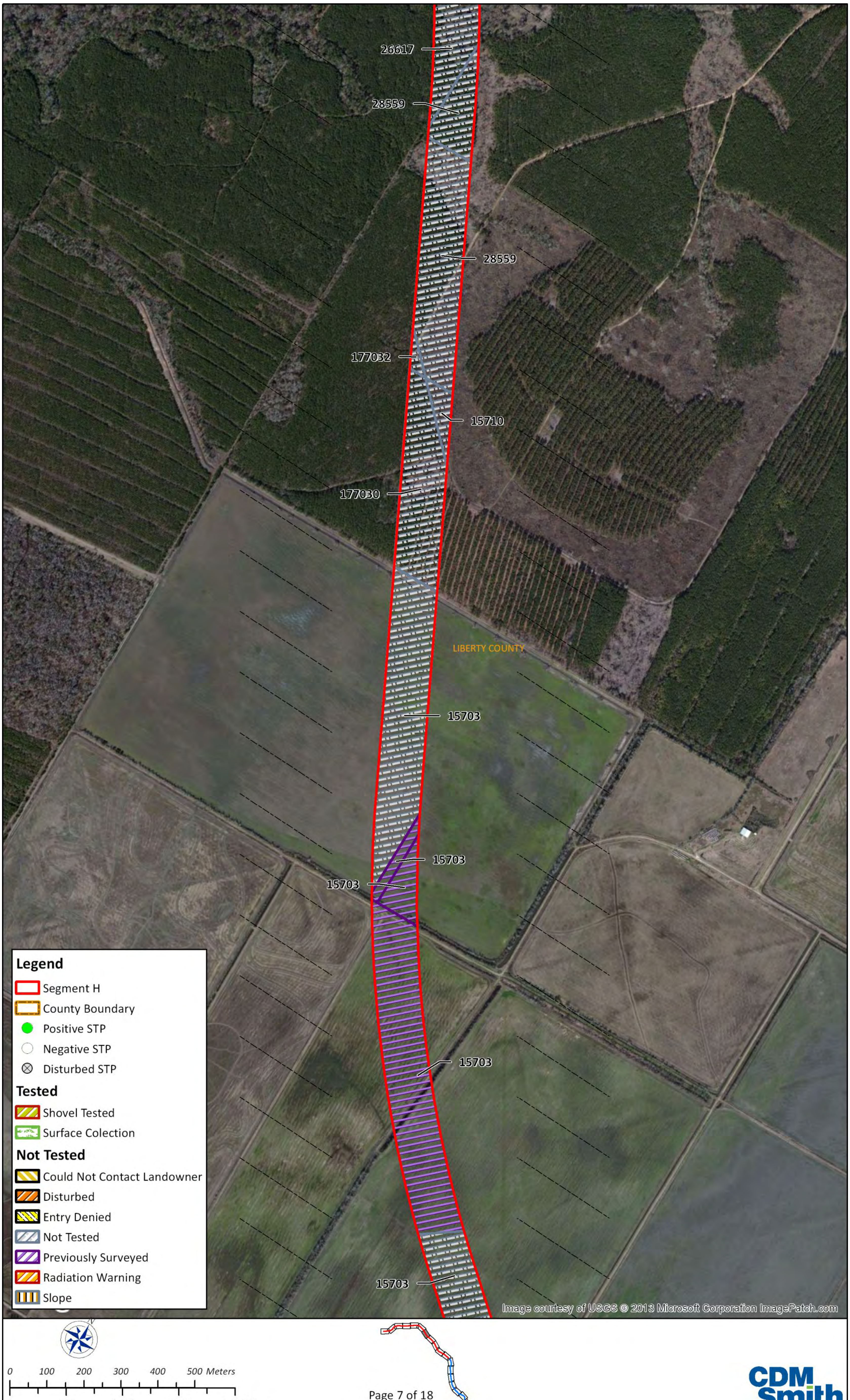


Figure 6-7. Test Status, Sheet 7 of 18.

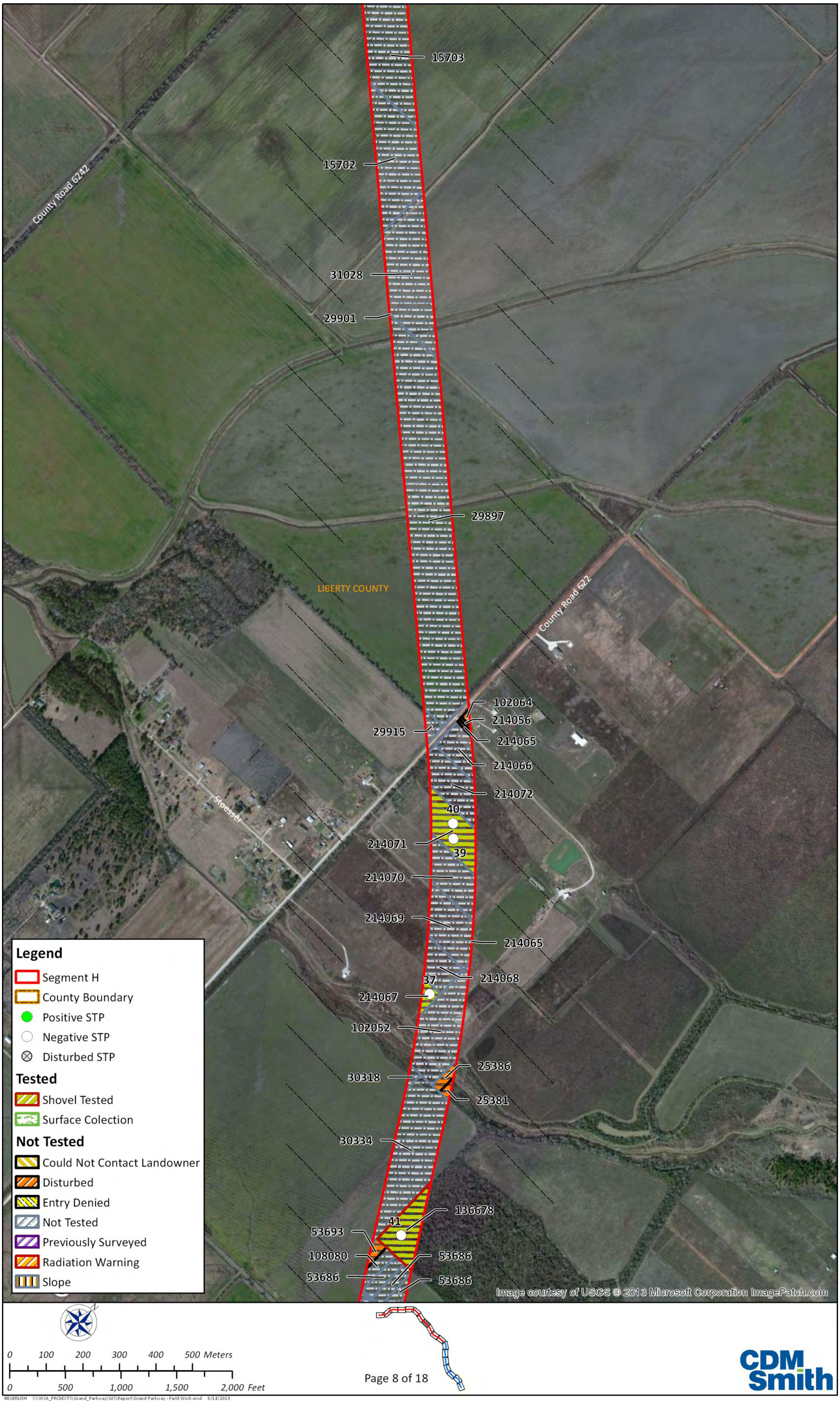


Figure 6-8. Test Status, Sheet 8 of 18.

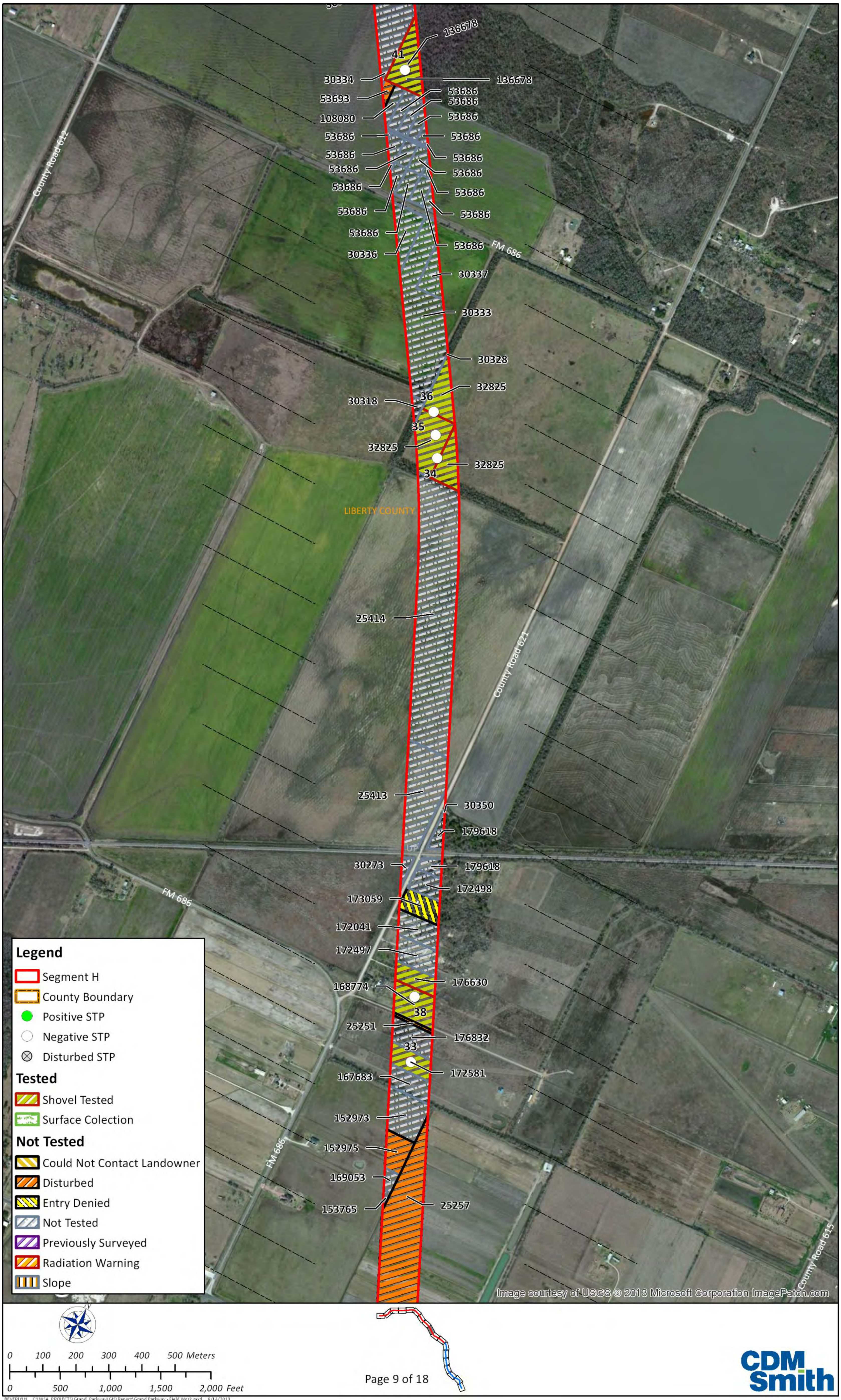


Figure 6-9. Test Status, Sheet 9 of 18.

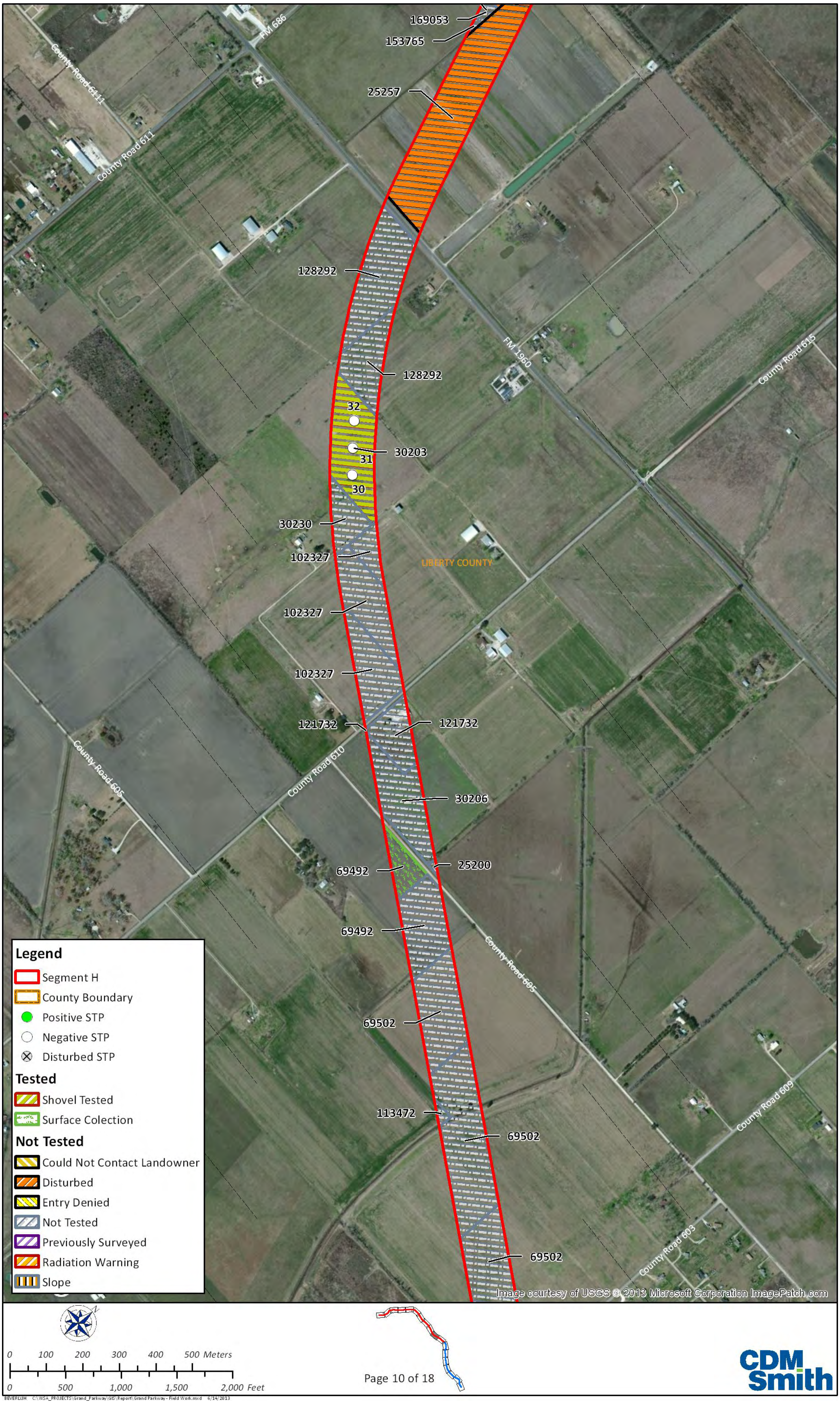


Figure 6-10. Test Status, Sheet 10 of 18.

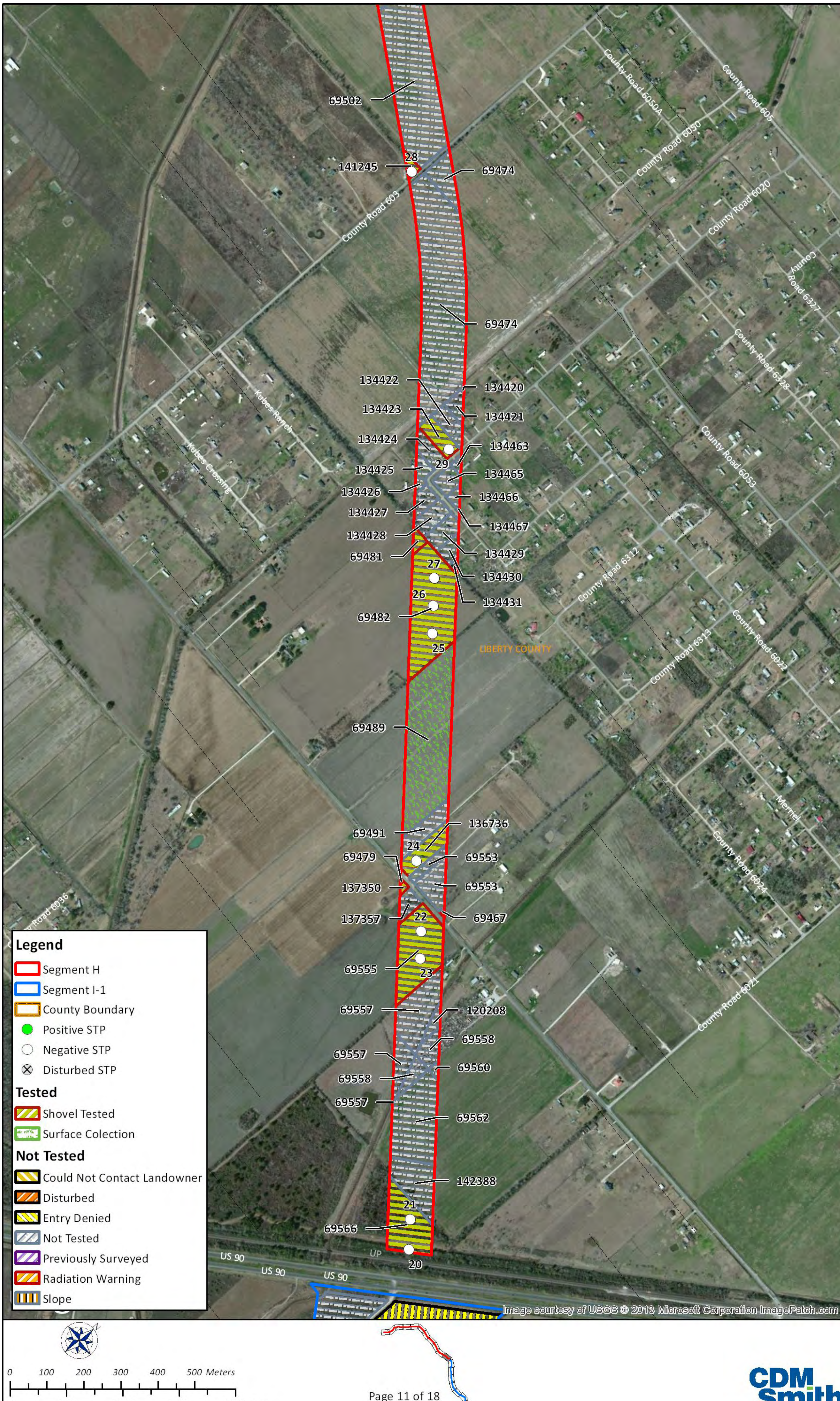


Figure 6-11. Test Status, Sheet 11 of 18.

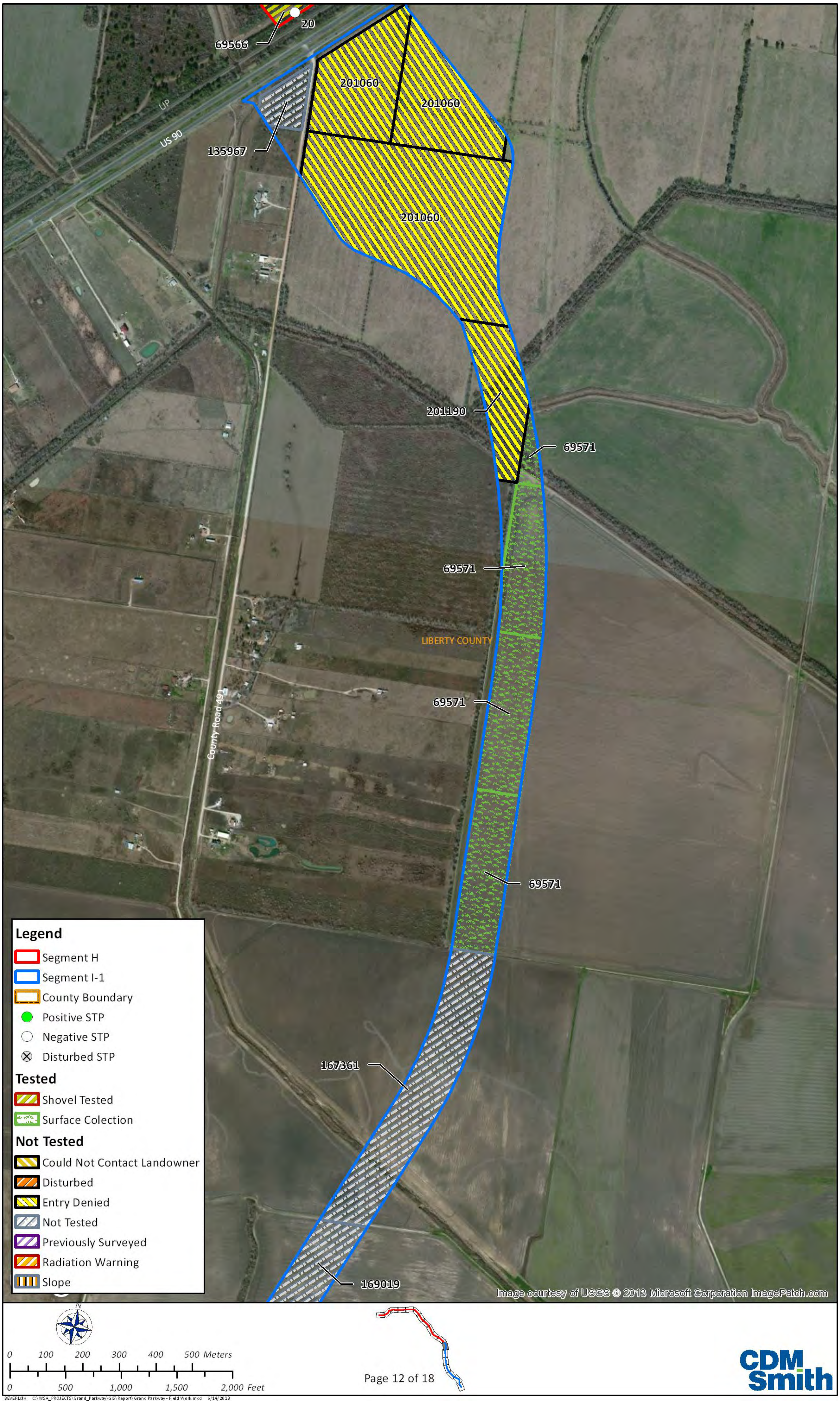


Figure 6-12. Test Status, Sheet 12 of 18.

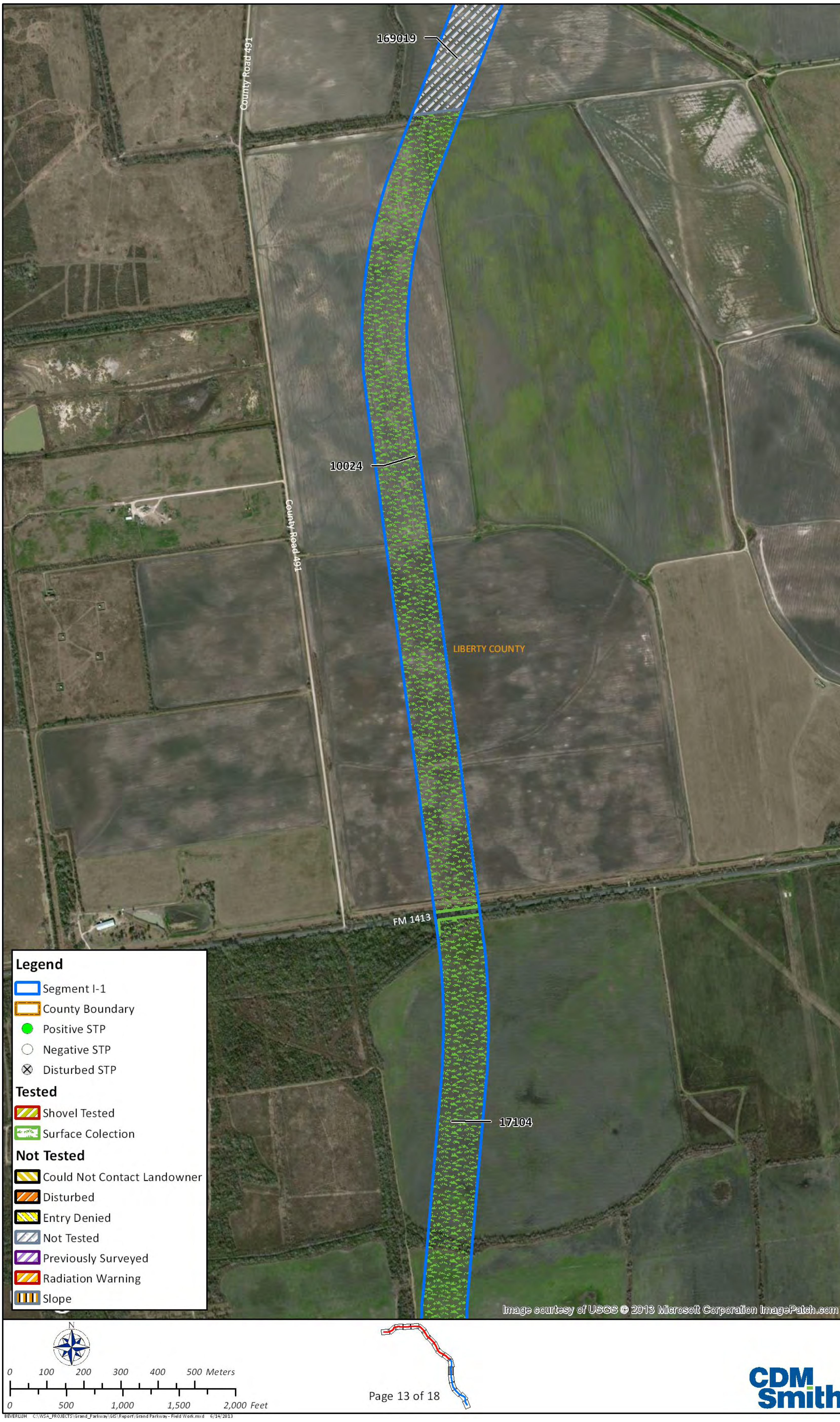


Figure 6-13. Test Status, Sheet 13 of 18.

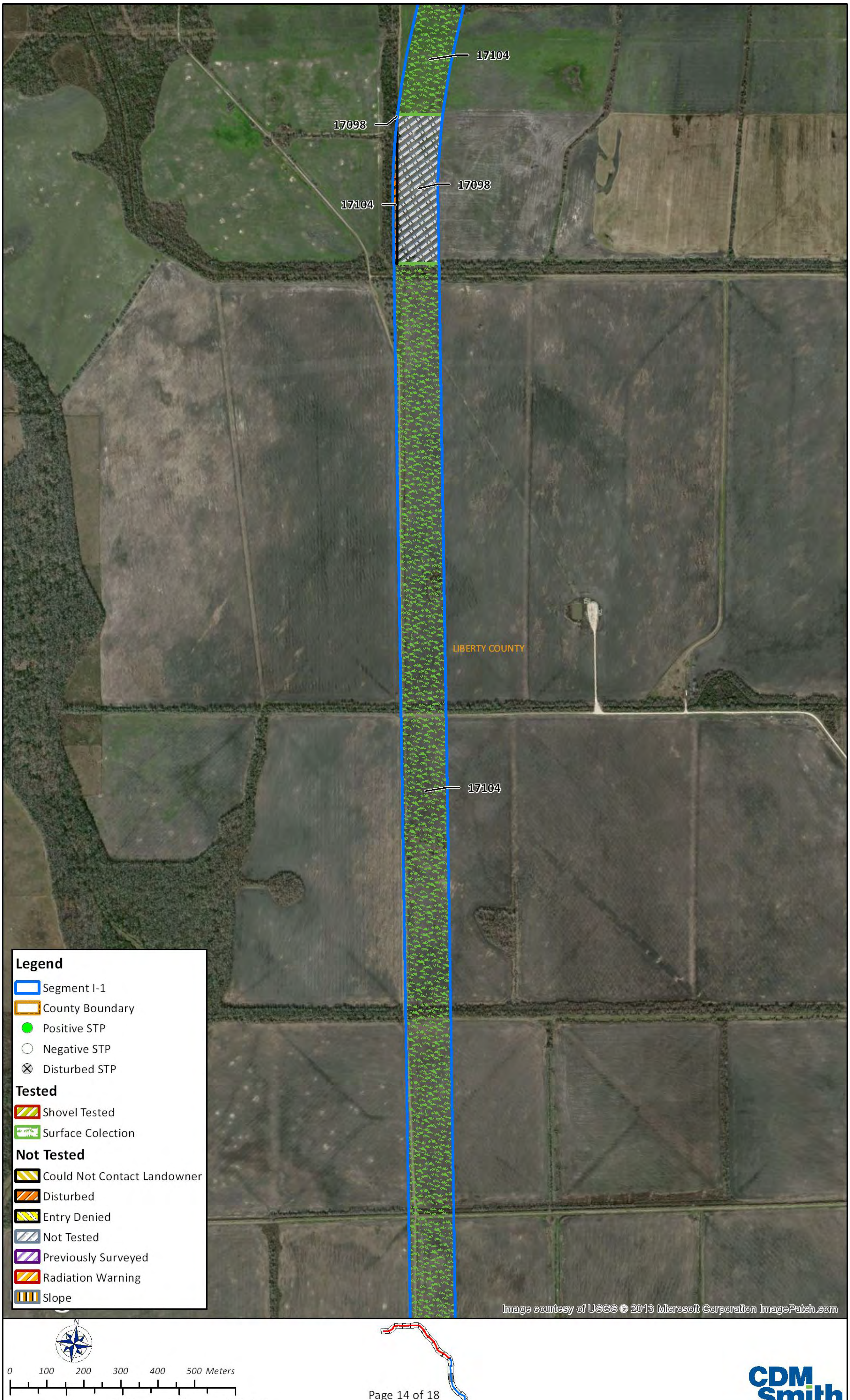


Figure 6-14. Test Status, Sheet 14 of 18.

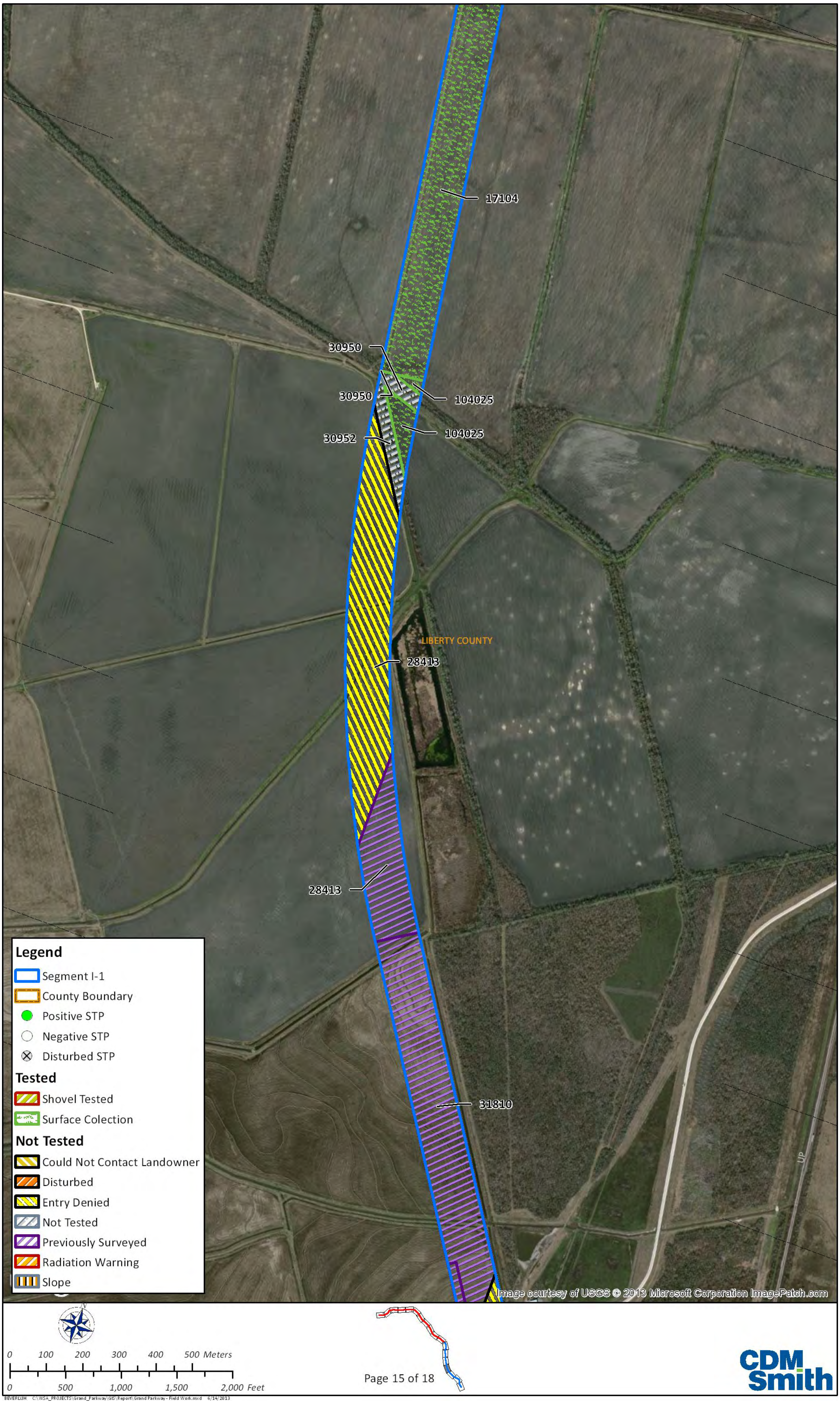


Figure 6-15. Test Status, Sheet 15 of 18.

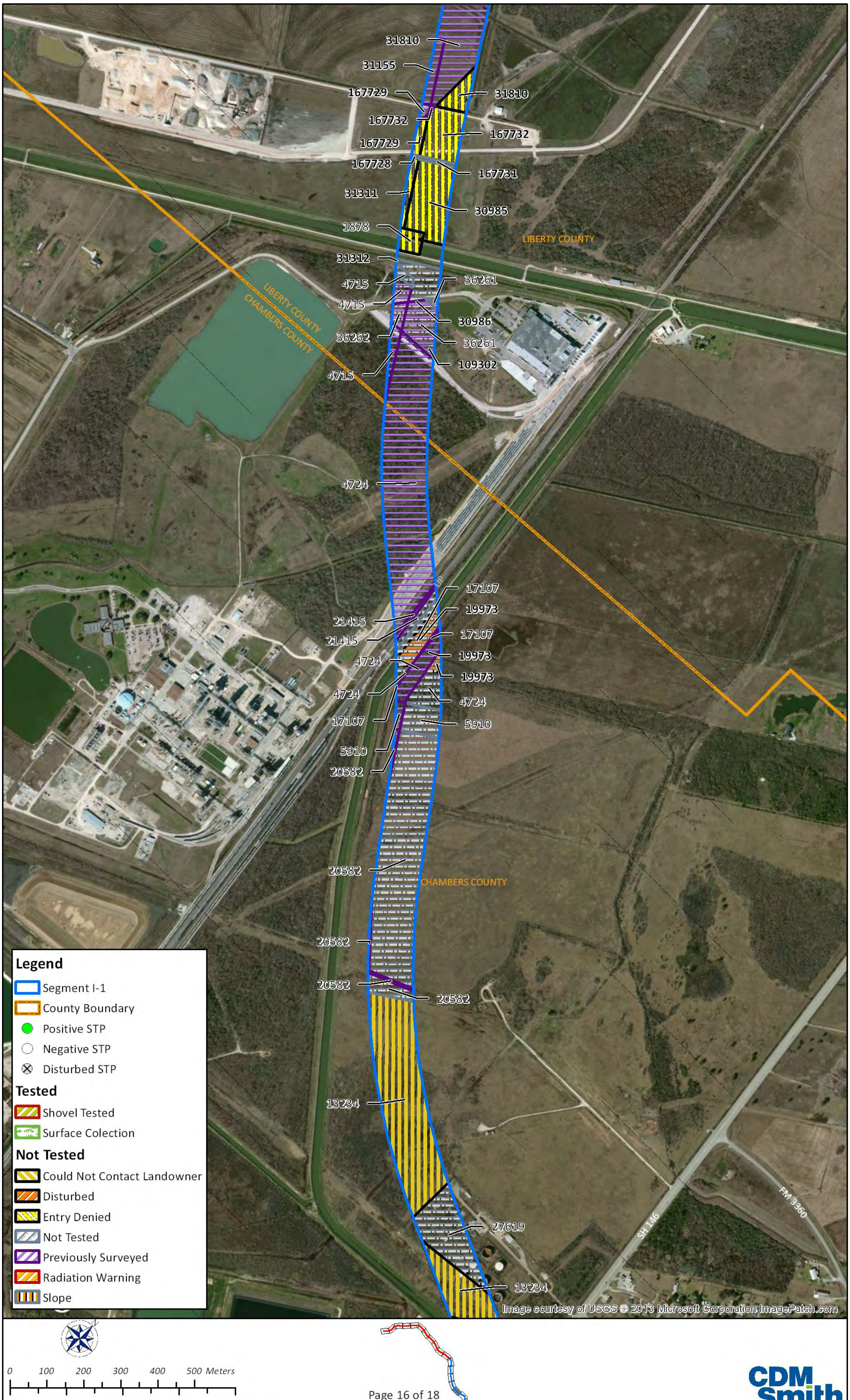


Figure 6-16. Test Status, Sheet 16 of 18.

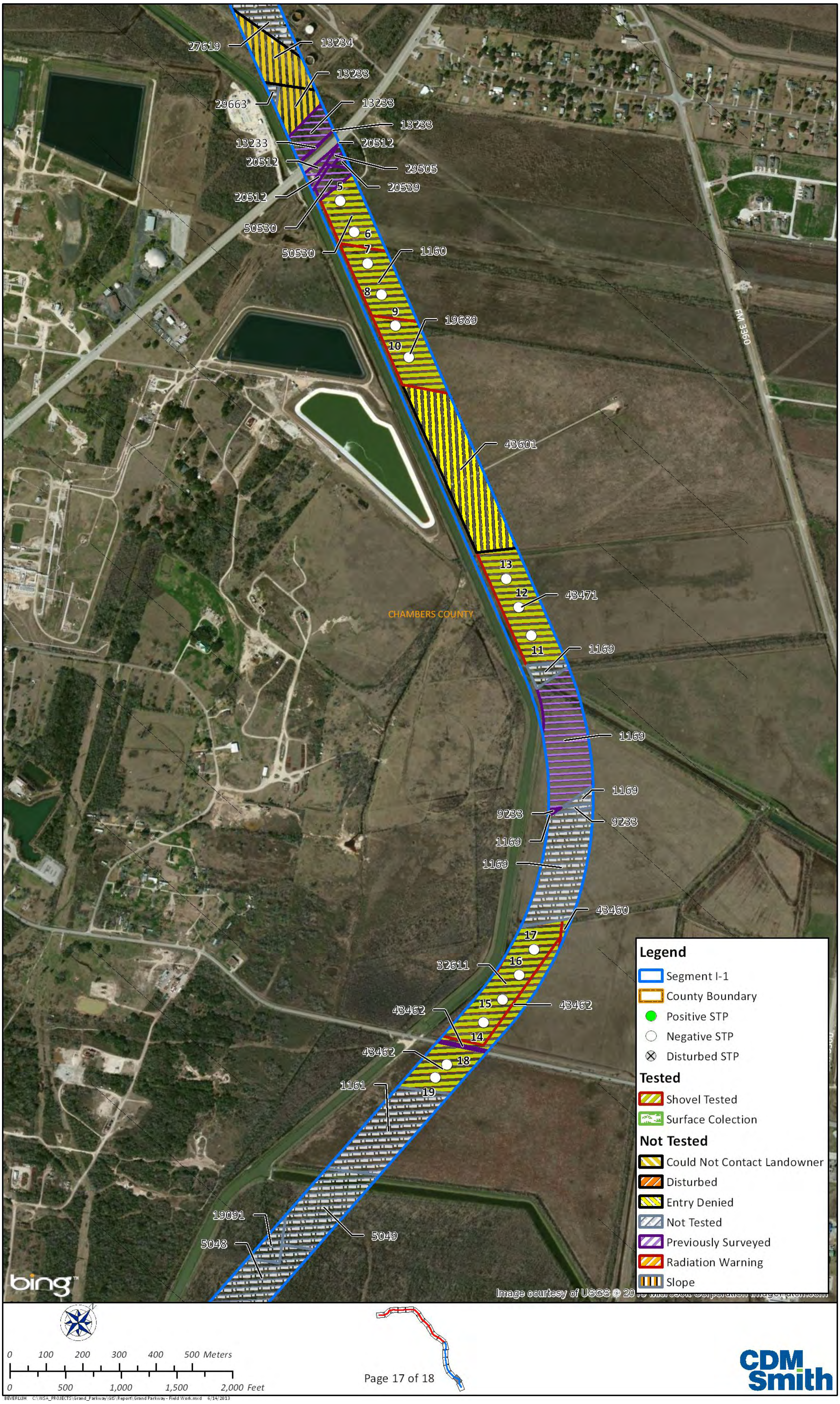


Figure 6-17. Test Status, Sheet 17 of 18.

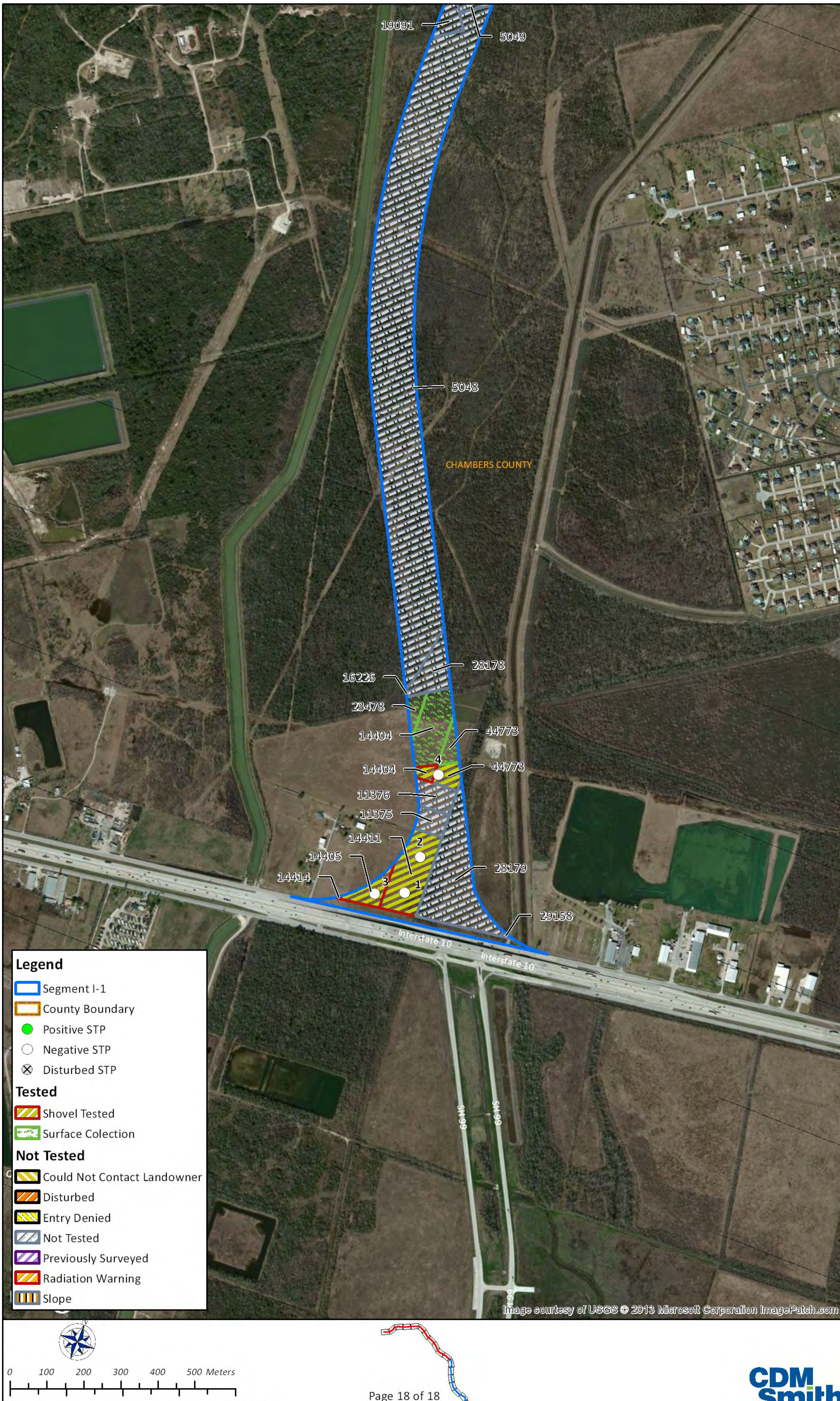


Figure 6-18. Test Status, Sheet 18 of 18.

6.2 Findings

Only one site was located, site 41MQ300.

6.2.1 Site 41MQ300

6.2.1.1 Location and Site Description

Site 41MQ300 is located on the 1959 (1979 photorevised) USGS Splendora, Texas, 7.5' Quadrangle (Figure 6-19). The UTM coordinates (Zone 15, NAD 83) for the center of the site are N 3337120.67918, E 294035.925975. The site is located approximately 97 feet (30 meters) AMSL and is situated at the At the North-east corner of the intersection of FM 1485 and Willaby Road, in Montgomery County, Texas (Figure 6-20). The site measures 10 meters (32.8 feet) east-west by 40 meters (131.2 feet) north-south and encompasses 0.04 hectares (0.09 acres). The site is located 250 meters (820 feet) northeast of Church House Gulley. Figure 6-21 and Figure 6-22 show the site area in a grass field on a relative flat surface.

Site 41MQ300 was originally located during the survey of a previous alignment of Segment H. The current alignment of Segment H incorporates a small portion of the original site area.

6.2.1.2 Stratigraphy

Thirteen STPs were placed across the site. Only 4 (51, 52, 55, and 58) produced cultural material. One STP (61) was disturbed. The typical stratigraphy for the site is represented by the profile of STP 53 (Figure 6-23 and Figure 6-24). A 2.5Y 6/3 light yellowish brown sandy loam extended from the surface to 19 cm below the surface (cmbs). Below this was a similar profile though with flecks of charcoal. It expended from 19 to 33 cm cmbs. From 33 to 45 cmbs was a 2.5Y 7/1 light gray sand.

6.2.1.3 Features

No features were encountered at site 41MQ300.

6.2.1.4 Artifact Analysis

Thirty-nine prehistoric lithic artifacts were recovered from site 41MQ300 (Table 6-5) and are described in Section 5. All were recovered from approximately 20 to 30 cmbs. The debitage consisted of a biface reduction flake, two intermediate flakes, and thirty-six shatter. Eleven of the prehistoric artifacts were made from a gray chert, 13 from a medium gray chert, and 15 from a light gray chert with inclusions.

One historic artifact was recovered from site 41MQ300 and is also described in Chapter Five. It is a small fragment of a metal wire (Table 6-6). It was recovered approximately 10 cmbs.

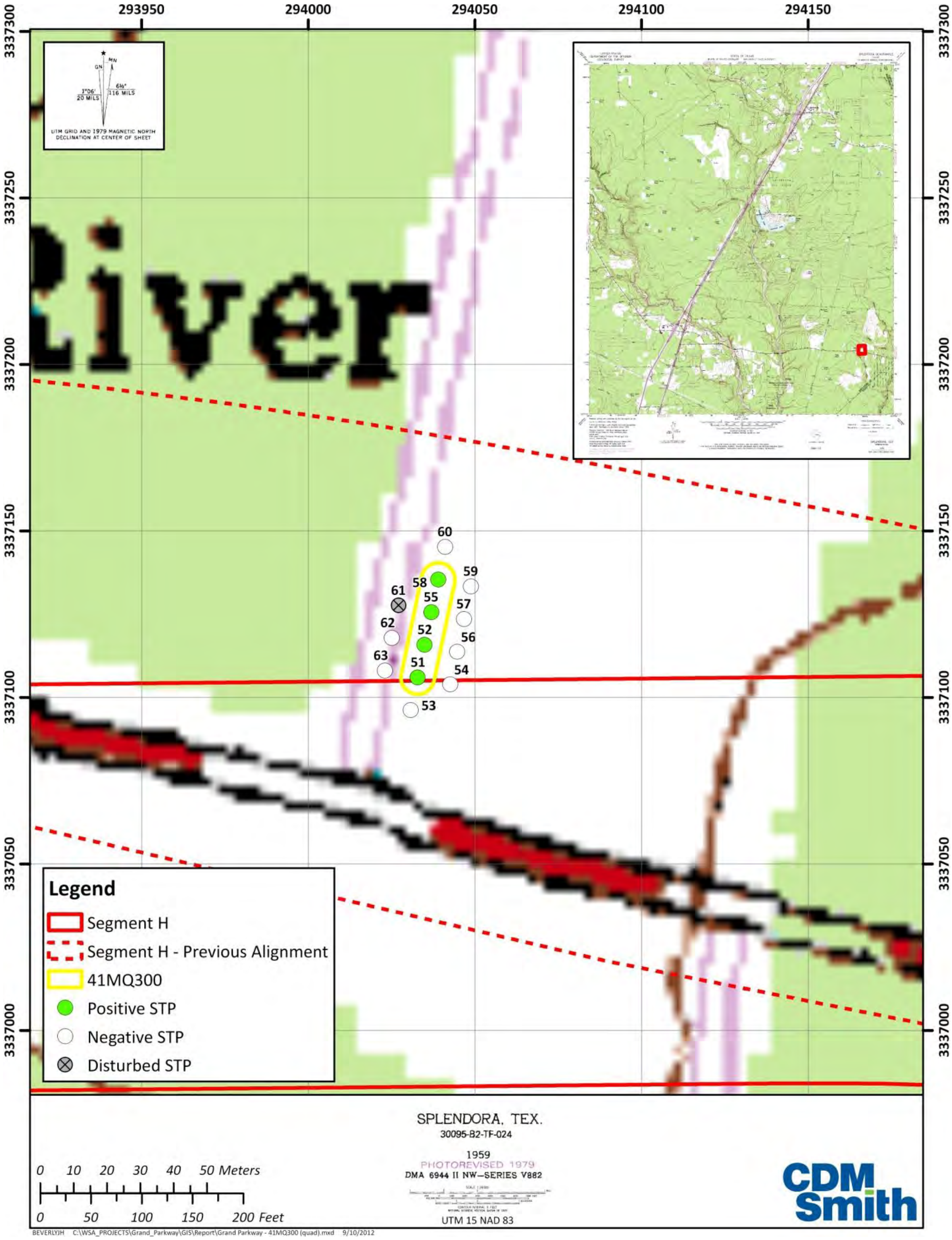


Figure 6-19. Location of Site 41MQ300 on USGS Topographic Quadrangle.

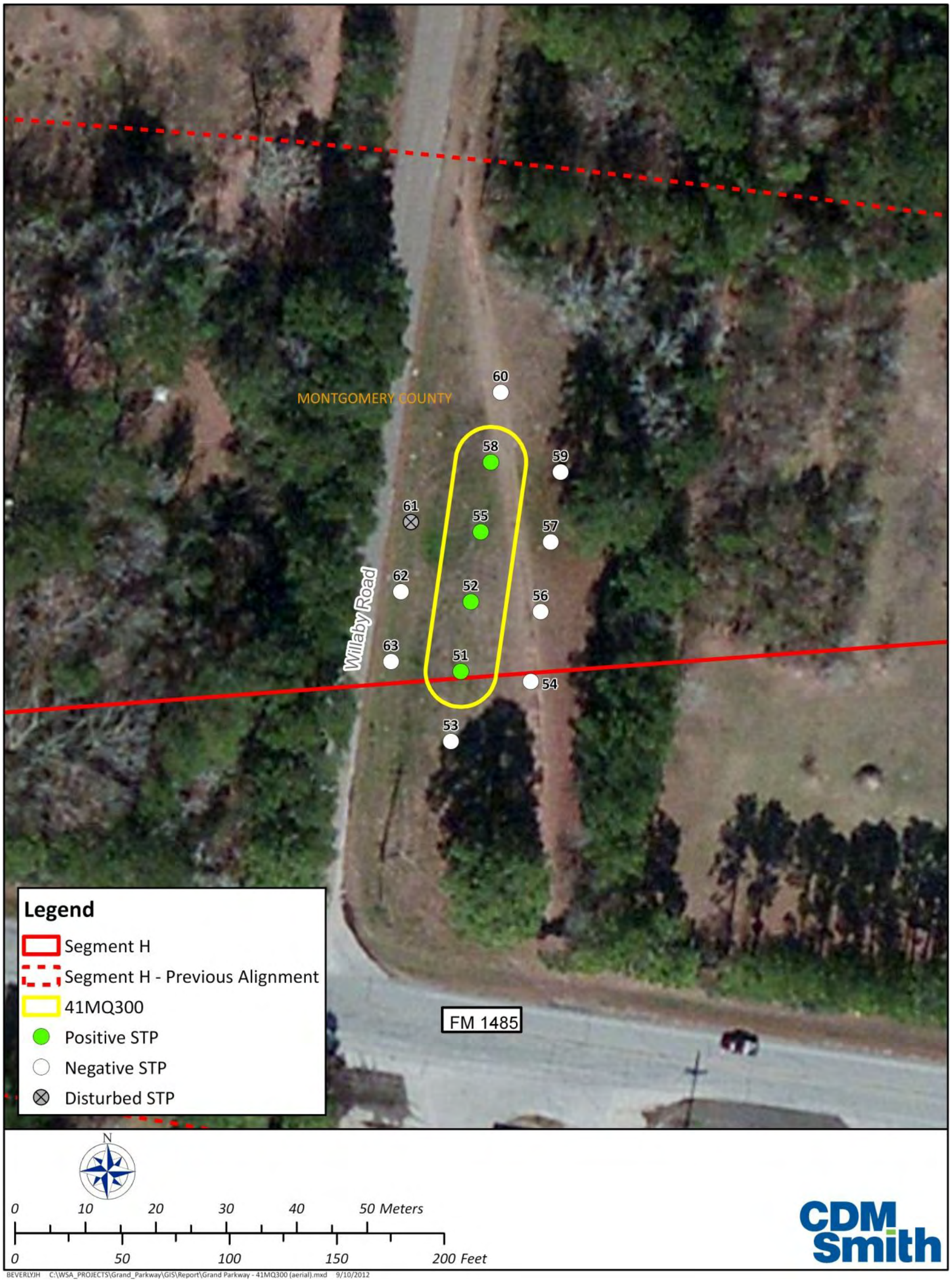


Figure 6-20. Location of Site 41MQ300 on Aerial Photograph.

Figure 6-21. General View of Site 41MQ300, Looking South.

Figure 6-22. General View of Site 41MQ300, Looking North.

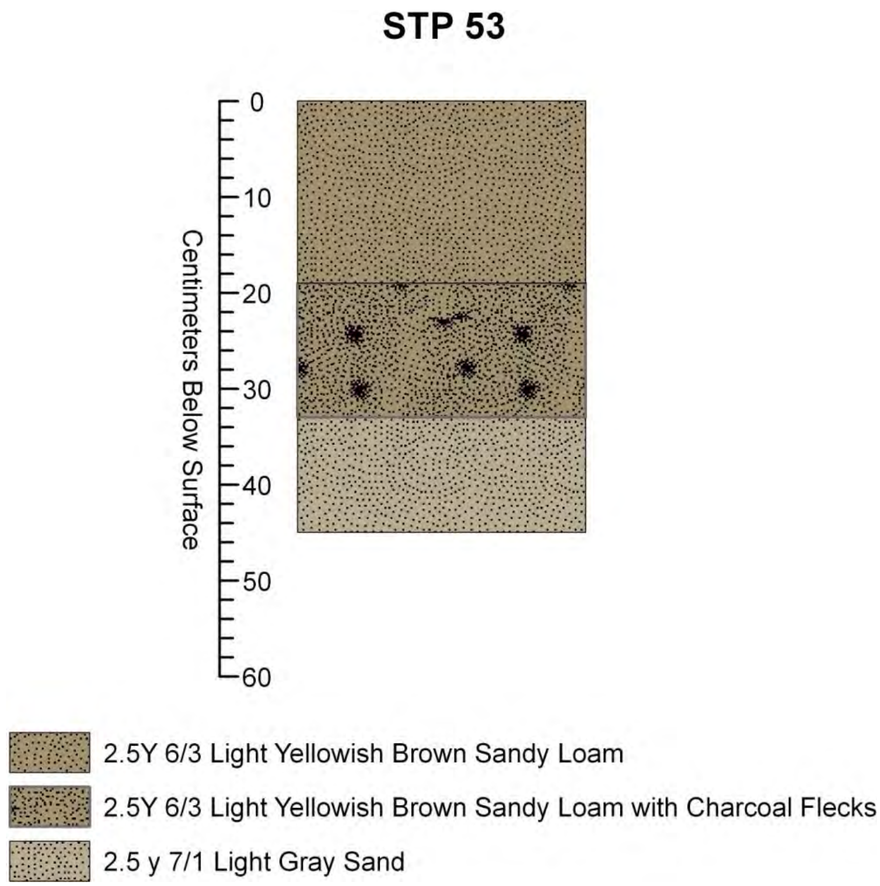


Figure 6-23. Site 41MQ300, STP 53 Profile.

Figure 6-24. Site 41MQ300, STP 53 Profile Photo.

Table 6-5. Prehistoric Artifacts Recovered from Site 41MQ300 by STP.

Type	STP 51	STP 52	STP 55	STP 58	Total
Biface Reduction			1		1
Indeterminate Flake			1	1	2
Shatter	2	1	20	13	36
Total	**2**	**1**	**22**	**14**	**39**

Table 6-6. Historic Artifacts Recovered from Site 41MQ300 by STP.

Type	STP 58	Total
Metal Wire	1	1
Total	**1**	**1**

6.2.1.5 Interpretation

Site 41MQ300 is a low-density, prehistoric lithic scatter from an undetermined cultural context with a small undetermined historic component. The prehistoric component of the site represents a short-term occupation by an unidentified prehistoric cultural group. The lithic artifacts are probably the result of expedient tool making confined to a small campsite area. The historic component of the site is probably recent. A review of the 1959 USGS Splendora 7.5' quadrangle (Figure 6-25) and 1957 aerial photographs do not show any historic structures in the vicinity (Figure 6-26). At the time of the survey an access road traversed the site (seen in Figure 6-20, above) and the metal wire could be related to the use of this road and probably dates to the mid-to-late 20th century.

It is difficult to draw conclusions of settlement activities and structure from so few historic and prehistoric artifacts. Since no diagnostic historic or prehistoric material was recovered it is not possible to assign the occupation to any cultural or temporal period other than undetermined prehistoric and mid-to-late 19th century historic occupation.

6.2.1.6 National Register Eligibility

No features or buried deposits were found. As a result, the site has limited research potential and is not considered potentially eligible for listing on the NRHP under Criterion D. Criteria A, B, and C do not apply. No further archaeological work is recommended for the site.

6.2.1.7 Recommendations

No further archaeological work is recommended for site 41MQ300.

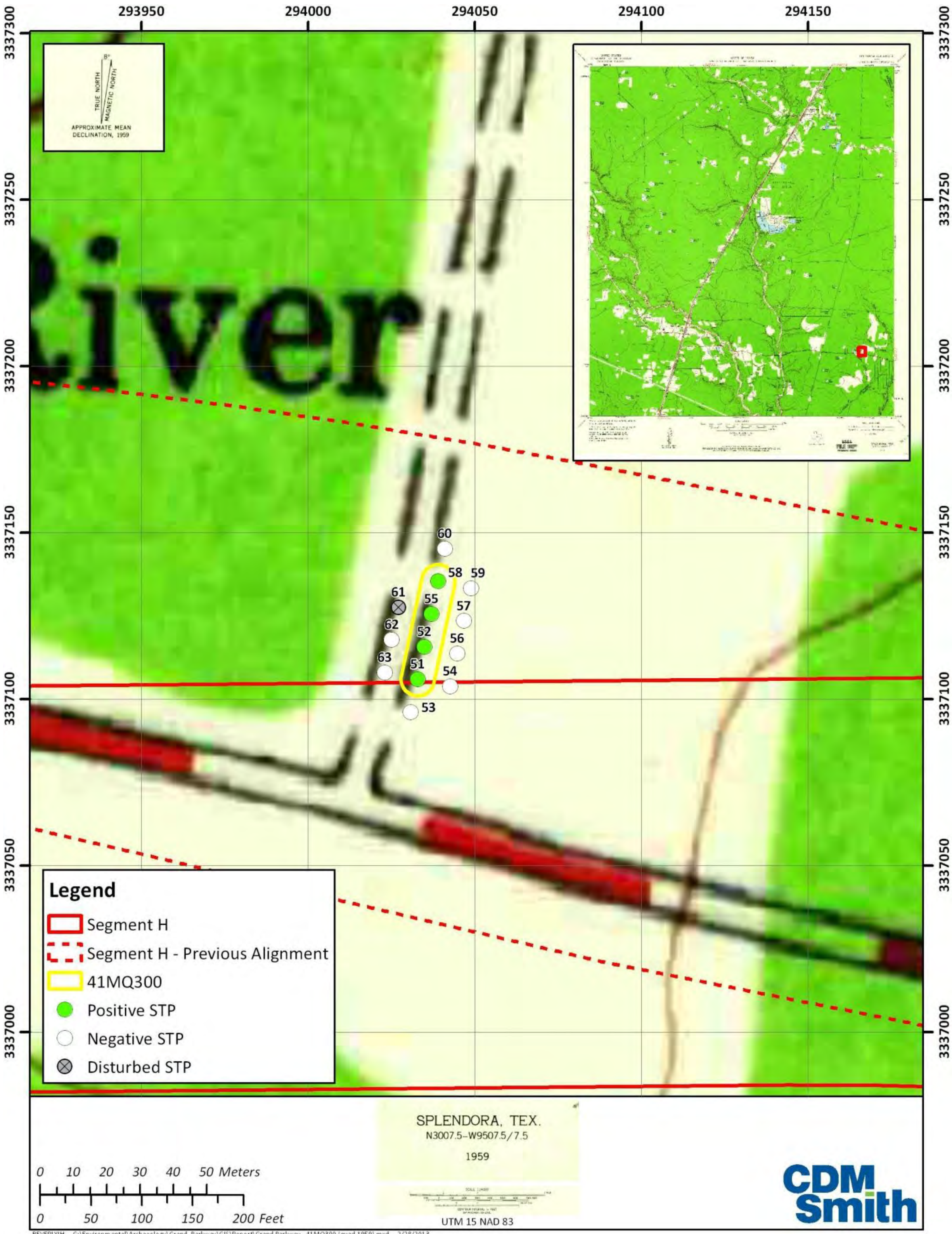


Figure 6-25. Location of Site 41MQ300 on 1959 Splendora USGS Topographic Quadrangle.

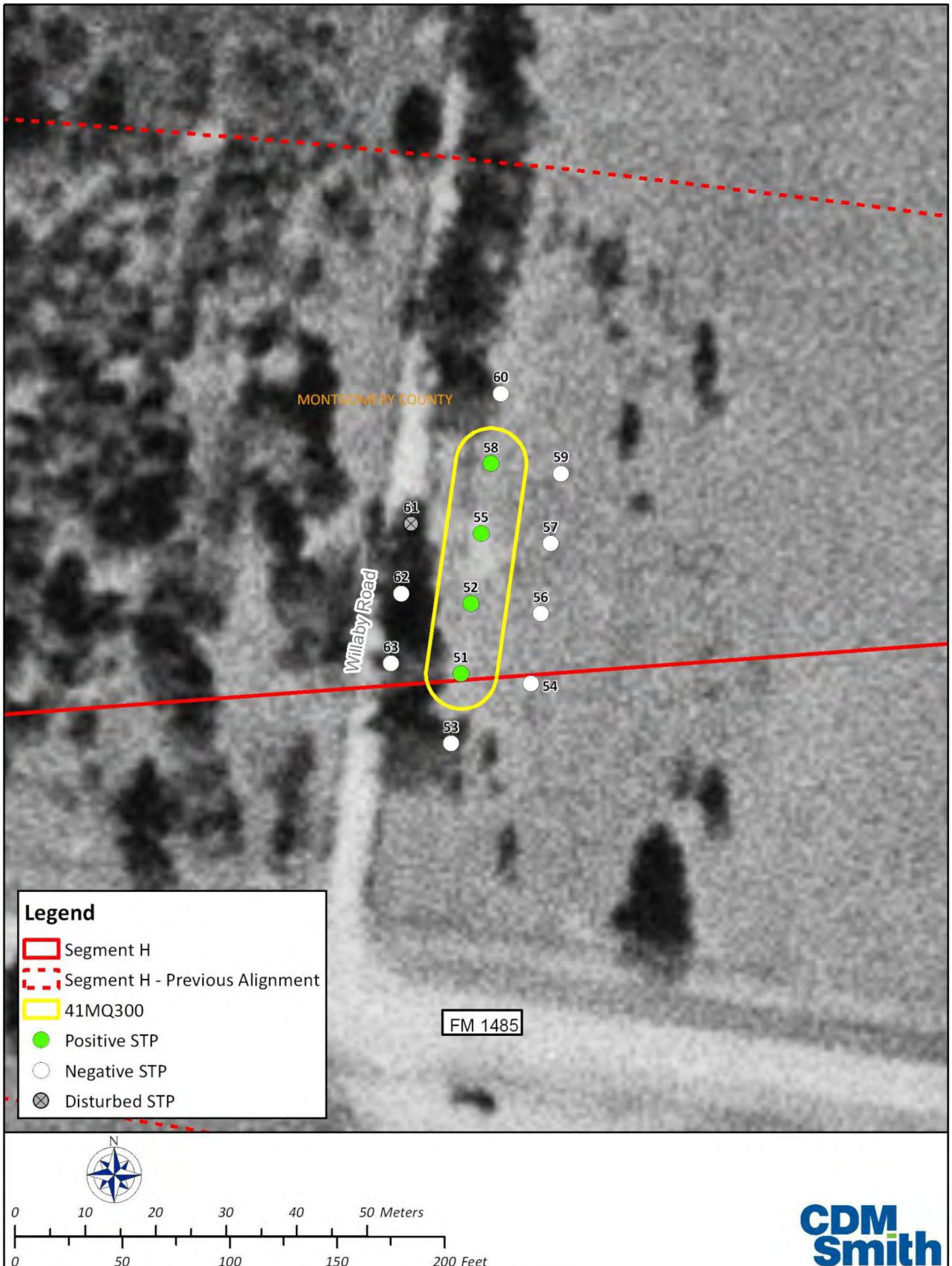


Figure 6-26. Location of Site 41MQ300 on 1957 Aerial Photograph.

6.3 Parcels not Tested

As mentioned earlier in Section 3, HNTB Corporation contracted with RODS Surveying, Inc. to stake the proposed right-of-way boundaries. As part of this effort they also gained permission for right of entry. The result of their efforts, as of November 23, 2011 is shown in Figure 6-27 through Figure 6-32. By the start of field work in June, 2012, right of entry was obtained by HNTB on a couple of additional parcels not originally shown on the figures provided by RODS Surveying. Despite the low percentage of permission granted, instructions were provided by HNTB to test only those parcels where right of entry had been obtained. This limitation was also included in the *Scope of Services for performing an Intensive Archaeological Survey for The Grand Parkway Segments H and I* submitted along with the *Antiquities Permit Application Form* in April 2012. The accumulated right of entries obtained by the initiation of fieldwork in June 2012 served as the basis for testing of the APE; parcels where entry was granted were tested. Entry was denied on a couple of parcels. They are described in Section 3.

The research design, presented in Section 3 and submitted along with the *Antiquities Permit Application Form*, acknowledges that a small percentage of the parcels were available for testing, and provides a plan for dealing with these parcels. As a result, Table 6-7 through Table 6-10, presents the parcels, by county, that were not tested. Their locations are shown in Figure 6-33 through Figure 6-50. The unique parcel identification number, the accompanying figure where the parcel is illustrated, the probability for locating archaeological sites, and comments (if necessary) is given for each parcel not tested.

The probability for locating archaeological sites is given in the format of high, medium, and low. The assessment is based on in-field observations, ground condition, and relies on the Houston Potential Archaeological Liability Mapping (PALM) or the historic (CDMS Historic) and prehistoric (CDMS Prehistoric) models developed by CDM Smith in 2006 for the planning phase of this project.

For all the parcels that were not tested, save the few parcels that have previously been subjected to an archaeological survey or found to have been heavily disturbed, they will need to be examined by a qualified archaeologist.

6.4 Alignment Shift at FM 1960

An additional alignment shift has just recently been made at FM 1960 almost a year after the competition of the field work (Figure 6-51). The new alignment falls outside the area previously surveyed and will need to be examined by a qualified archaeologist.

6.5 Evaluation of Models

In general, the intensive archaeological survey conducted on Segments H and I-1 of the GPA located only one archaeological site. This site, 41MQ300 was located through shovel testing in an area identified by the PALM as needing no survey. In fact, the only archaeological sites near the APE are found nearby at Lake Houston Park, also in an area identified by the PALM as not needing a survey. All three sites, though, are located in the high probability area for prehistoric sites according to the 2006 CDMS prehistoric model. With such a small sample of sites in or near the APE, it is hard to evaluate the models used. One of the components of the CDMS models that should be recognized is the use of water as a settlement attractant. Unfortunately the model relied on hydrology data reflecting current drainage. The project area, specifically to the south, is crisscrossed by an intensive network of irrigation canals of recent origin. These canals caused the model to erroneously score the surrounding

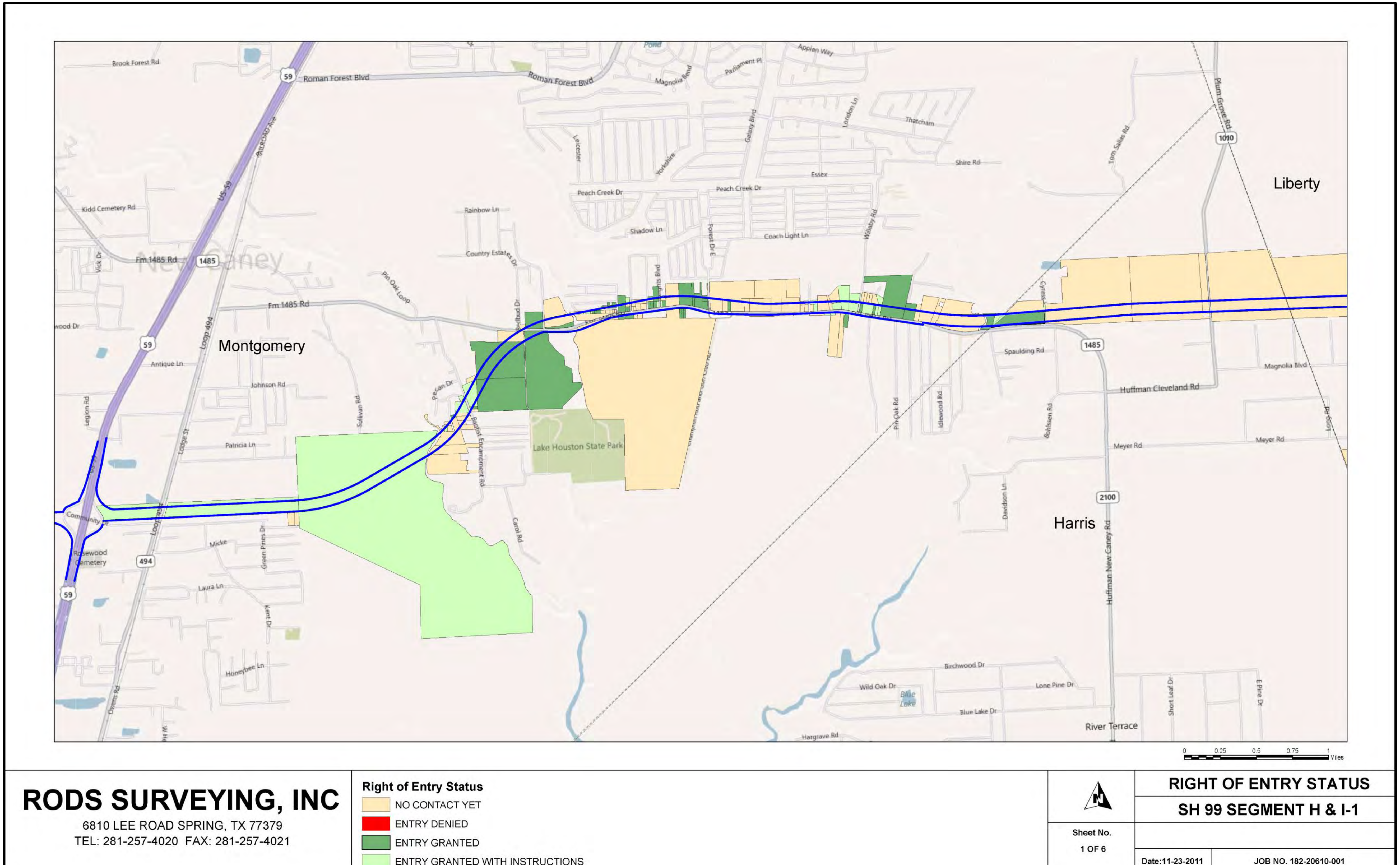


Figure 6-27. RODS Surveying, Right of Entry Status, Sheet 1 of 6.

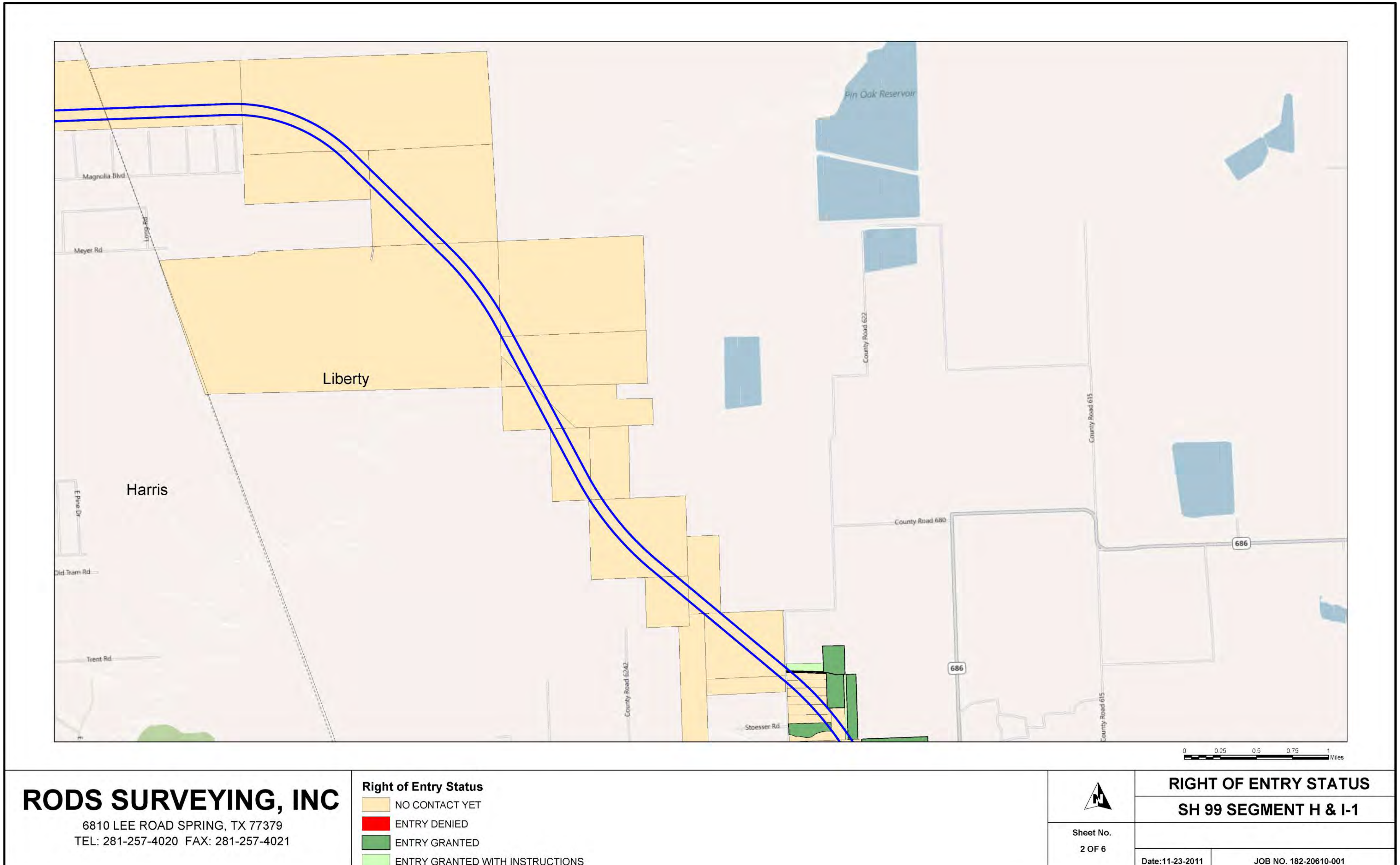


Figure 6-28. RODS Surveying, Right of Entry Status, Sheet 2 of 6.

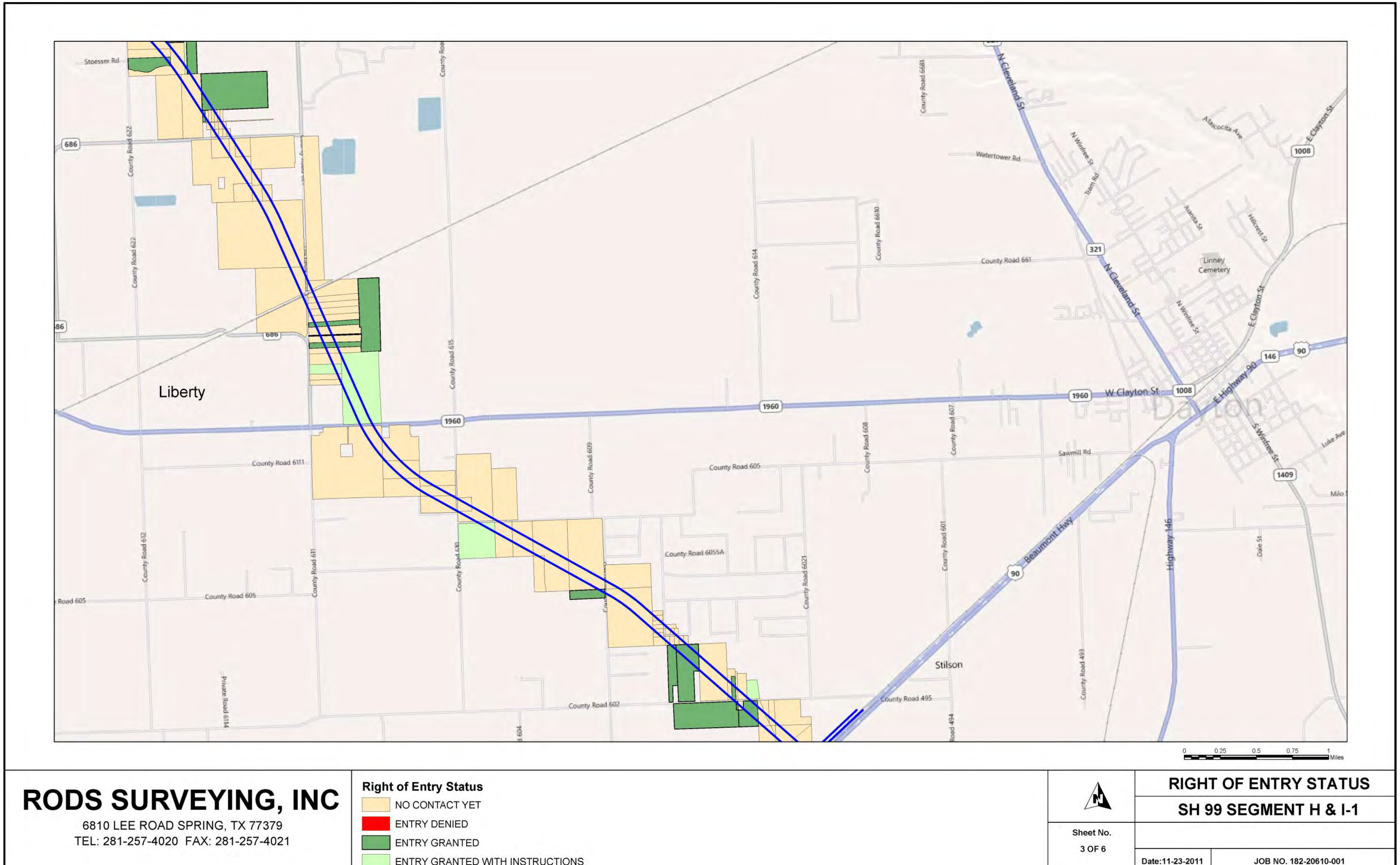


Figure 6-29. RODS Surveying, Right of Entry Status, Sheet 3 of 6.

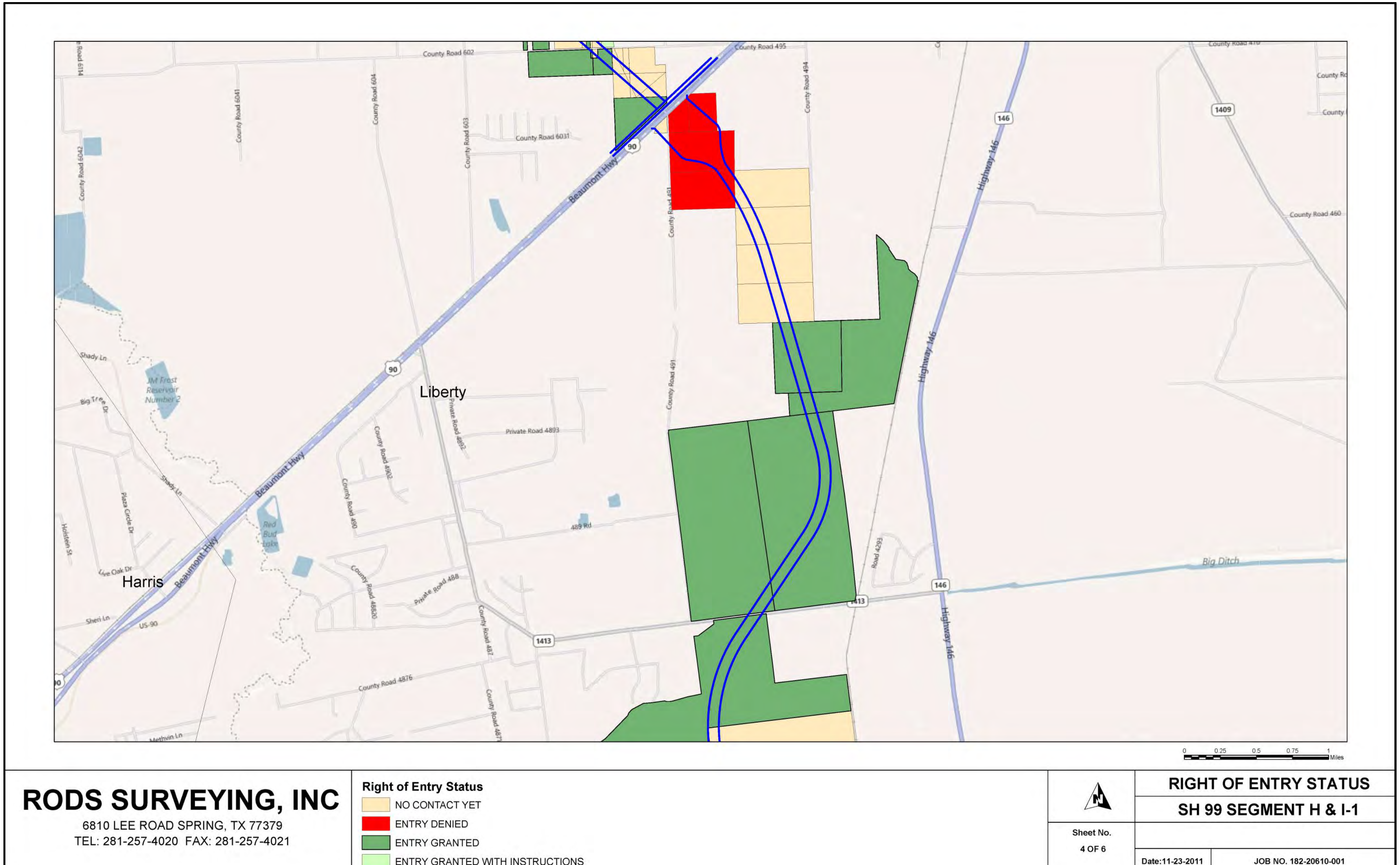


Figure 6-30. RODS Surveying, Right of Entry Status, Sheet 4 of 6.

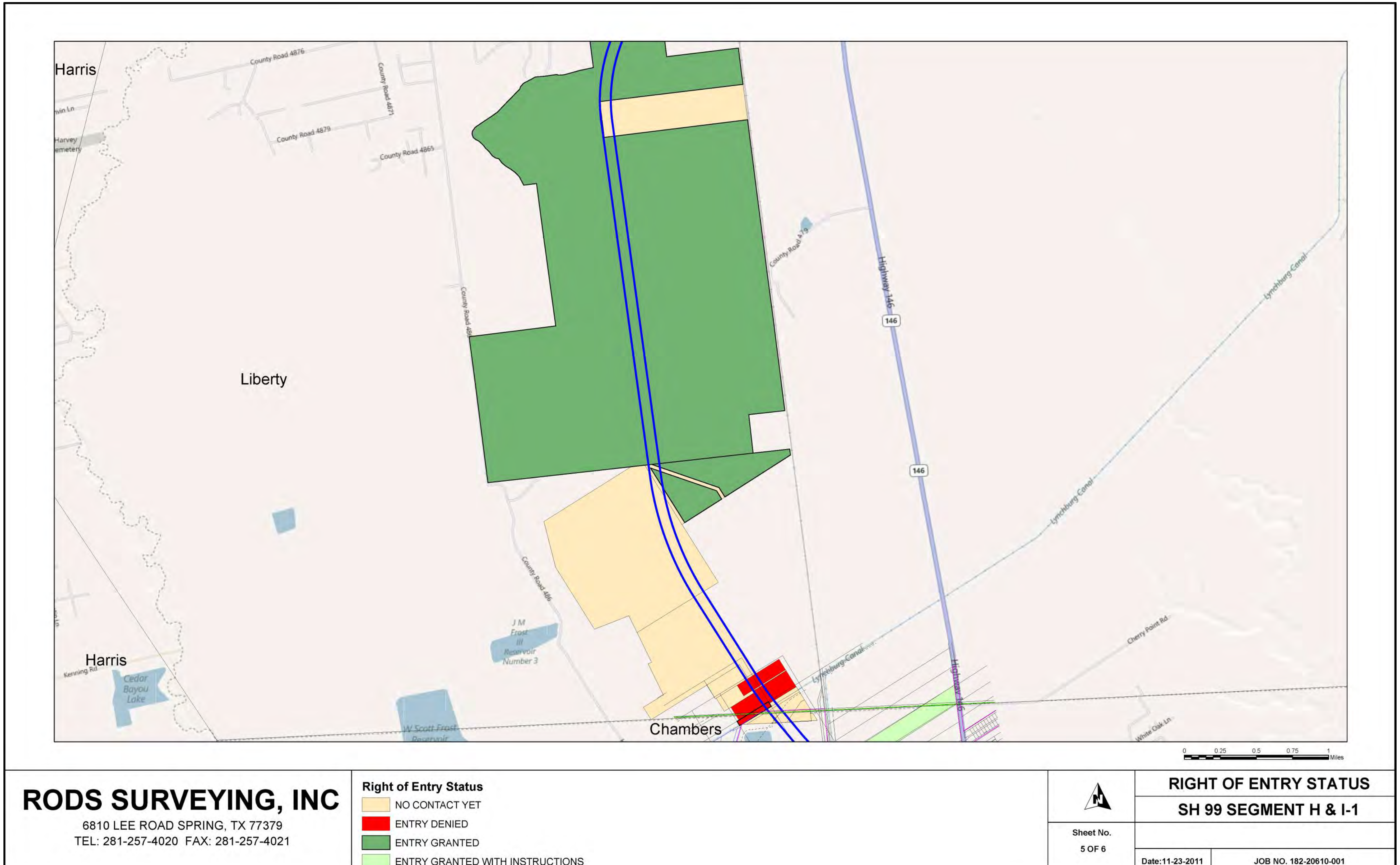


Figure 6-31. RODS Surveying, Right of Entry Status, Sheet 5 of 6.

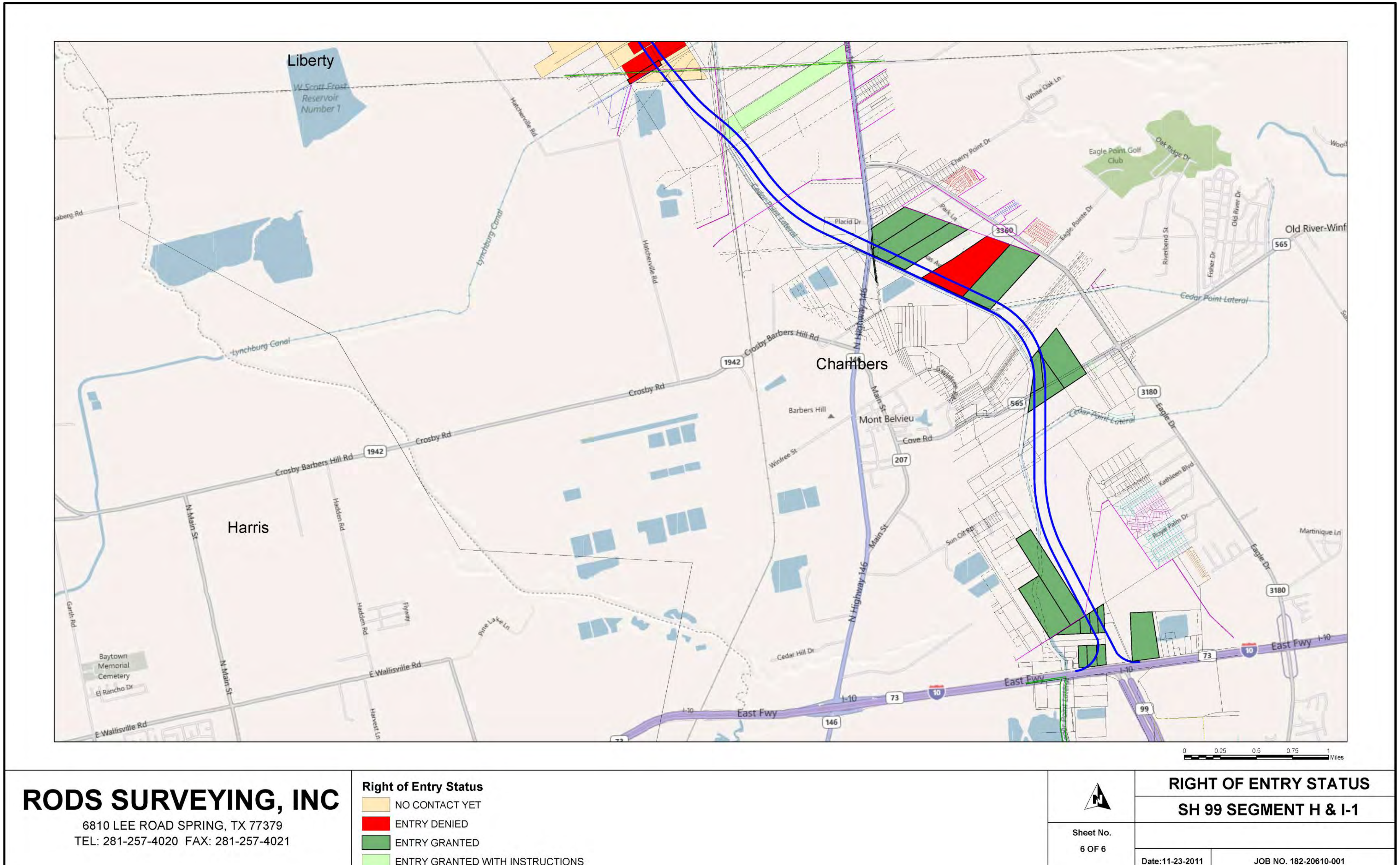


Figure 6-32. RODS Surveying, Right of Entry Status, Sheet 6 of 6.

Table 6-7. Montgomery County Parcels not Tested.

Property Identification Number (PIN)	Figure	Site Probability	Comment
R128883	Figure 6-33	-	PALM: No survey recommended. CDMS Historic: Low. CDMS Prehistoric: Medium. Portion of parcel within APE has been heavily impacted by industrial development.
R128884	Figure 6-33	-	PALM: No survey recommended. CDMS Historic: Low. CDMS Prehistoric: Medium. Portion of parcel within APE has been heavily impacted by industrial development.
99999a	Figure 6-33	Medium	PALM: Surface survey recommended. Deep reconnaissance recommended if deep impacts occur. / No surface survey recommended. Deep reconnaissance recommended only if deep impacts are anticipated. CDMS Historic: Medium. CDMS Prehistoric: Medium - High.
R144429	Figure 6-33	Medium	PALM - No surface survey recommended. Deep reconnaissance recommended only if deep impacts are anticipated. CDMS Historic: Medium. CDMS Prehistoric: High.
R243168	Figure 6-33	-	PALM: Surface survey recommended. Deep reconnaissance recommended if deep impacts occur. CDMS Historic: Medium. CDMS Prehistoric: High. Portion of parcel within APE has been heavily impacted by agricultural development.
R52540	Figure 6-33	Medium	PALM: Surface survey recommended. Deep reconnaissance recommended if deep impacts occur. CDMS Historic: Low - Medium. CDMS Prehistoric: Low, High.
R52667	Figure 6-33	Medium	PALM: Surface survey recommended. Deep reconnaissance recommended if deep impacts occur. CDMS Historic: Low - Medium. CDMS Prehistoric: Low, High.
R52679	Figure 6-33	Medium	PALM: Surface survey recommended. Deep reconnaissance recommended if deep impacts occur. CDMS Historic: Low - Medium. CDMS Prehistoric: High.
R52680	Figure 6-33	Medium	PALM: Surface survey recommended. Deep reconnaissance recommended if deep impacts occur. CDMS Historic: Low - Medium. CDMS Prehistoric: High.

Property Identification Number (PIN)	Figure	Site Probability	Comment
R52681	Figure 6-33	Medium	PALM: Surface survey recommended. Deep reconnaissance recommended if deep impacts occur.
			CDMS Historic: Low - Medium. CDMS Prehistoric: High.
R52682	Figure 6-33	Medium	PALM: Surface survey recommended. Deep reconnaissance recommended if deep impacts occur.
			CDMS Historic: Low - Medium. CDMS Prehistoric: High.
R70826	Figure 6-33	Medium	PALM: Surface survey recommended. Deep reconnaissance recommended if deep impacts occur.
			CDMS Historic: Low - Medium. CDMS Prehistoric: High.
R70851	Figure 6-33	Medium	PALM: Surface survey recommended. Deep reconnaissance recommended if deep impacts occur.
			CDMS Historic: Low - Medium. CDMS Prehistoric: High.
R70854	Figure 6-33	Medium	PALM: Surface survey recommended. Deep reconnaissance recommended if deep impacts occur.
			CDMS Historic: Low - Medium. CDMS Prehistoric: Low.
R42046A	Figure 6-33, Figure 6-34	Medium	PALM: Surface survey recommended. Deep reconnaissance recommended if deep impacts occur. / Surface survey recommended. No deep reconnaissance recommended. / No survey recommended.
			CDMS Historic: Low - Medium. CDMS Prehistoric: Low - High.
			Archaeological sites 41MQ246, 41MQ247, and 41MQ300 are located nearby.
			Previously surveyed by Moore and Driver 2009.
R52665	Figure 6-33, Figure 6-34	Medium	PALM: Surface survey recommended. Deep reconnaissance recommended if deep impacts occur.
			CDMS Historic: Low - Medium. CDMS Prehistoric: Low, High.
R42046	Figure 6-33, Figure 6-34 Figure 6-36	Medium	PALM: Surface survey recommended. Deep reconnaissance recommended if deep impacts occur. / Surface survey recommended. No deep reconnaissance recommended. / No surface survey recommended. Deep reconnaissance recommended only if deep impacts are anticipated. / No survey recommended.
			CDMS Historic: Low - Medium. CDMS Prehistoric: Low - High.
			Archaeological sites 41MQ246, 41MQ247, and 41MQ300 are located nearby.
			Previously surveyed by Moore and Driver 2009.

Property Identification Number (PIN)	Figure	Site Probability	Comment
R125128	Figure 6-35	Medium	PALM - No survey recommended.
			CDMS Historic: Medium. CDMS Prehistoric: High.
			Archaeological sites 41MQ246, 41MQ247, and 41MQ300 are located nearby.
R125169	Figure 6-35	Medium	PALM - No survey recommended.
			CDMS Historic: Medium. CDMS Prehistoric: High.
			Archaeological sites 41MQ246, 41MQ247, and 41MQ300 are located nearby.
R125186	Figure 6-35	-	PALM - No survey recommended.
			CDMS Historic: Medium. CDMS Prehistoric: High.
			Archaeological sites 41MQ246, 41MQ247, and 41MQ300 are located nearby.
			Portion of parcel within APE has been heavily impacted by industrial development.
R125187	Figure 6-35	-	PALM - No survey recommended.
			CDMS Historic: Medium. CDMS Prehistoric: High.
			Archaeological sites 41MQ246, 41MQ247, and 41MQ300 are located nearby.
			Portion of parcel within APE has been heavily impacted by industrial development.
R125188	Figure 6-35	Medium	PALM - No survey recommended.
			CDMS Historic: Medium. CDMS Prehistoric: High.
			Archaeological sites 41MQ246, 41MQ247, and 41MQ300 are located nearby.
R125200	Figure 6-35	-	PALM - No survey recommended.
			CDMS Historic: Medium. CDMS Prehistoric: High.
			Archaeological sites 41MQ246, 41MQ247, and 41MQ300 are located nearby.
			Portion of parcel within APE has been heavily impacted by industrial development.
R125201	Figure 6-35	-	PALM - No survey recommended.
			CDMS Historic: Medium. CDMS Prehistoric: High.
			Archaeological sites 41MQ246, 41MQ247, and 41MQ300 are located nearby.

Property Identification Number (PIN)	Figure	Site Probability	Comment
			Portion of parcel within APE has been heavily impacted by industrial development.
R125202	Figure 6-35	-	PALM - No survey recommended.
			CDMS Historic: Medium. CDMS Prehistoric: High.
			Archaeological sites 41MQ246, 41MQ247, and 41MQ300 are located nearby.
			Portion of parcel within APE has been heavily impacted by industrial development.
R125225	Figure 6-35	-	PALM - No survey recommended.
			CDMS Historic: Medium. CDMS Prehistoric: High.
			Portion of parcel within APE has been heavily impacted by industrial development.
R138034	Figure 6-35	Medium	PALM - No survey recommended.
			CDMS Historic: Medium. CDMS Prehistoric: Medium.
R138040	Figure 6-35	Medium	PALM - No survey recommended.
			CDMS Historic: Medium. CDMS Prehistoric: Medium.
R138046	Figure 6-35	Low	PALM: Surface survey recommended. Deep reconnaissance recommended if deep impacts occur.
			CDMS Historic: Low. CDMS Prehistoric: Low.
R138053	Figure 6-35	Medium	PALM - No survey recommended.
			CDMS Historic: Medium. CDMS Prehistoric: Medium.
R163245	Figure 6-35	Low	PALM - No survey recommended.
			CDMS Historic: Medium. CDMS Prehistoric: High.
			Archaeological sites 41MQ246, 41MQ247, and 41MQ300 are located nearby.
			Portion of parcel within APE has been disturbed by commercial development.
R222169	Figure 6-35	Medium	PALM - No survey recommended.
			CDMS Historic: Medium. CDMS Prehistoric: High.
			Archaeological sites 41MQ246, 41MQ247, and 41MQ300 are located nearby.
R236994	Figure 6-35	Medium	PALM - No survey recommended.
			CDMS Historic: Low - Medium. CDMS Prehistoric: Low - High.

Property Identification Number (PIN)	Figure	Site Probability	Comment
			Archaeological sites 41MQ246, 41MQ247, and 41MQ300 are located nearby.
R236995	Figure 6-35	-	Outside existing Segment H alignment.
R42044A	Figure 6-35	Medium	PALM: Surface survey recommended. Deep reconnaissance recommended if deep impacts occur. / Surface survey recommended. No deep reconnaissance recommended. / No survey recommended.
			CDMS Historic: Low - Medium. CDMS Prehistoric: Low - High.
R42044B	Figure 6-35	Medium	PALM - No survey recommended.
			CDMS Historic: Low - Medium. CDMS Prehistoric: Medium - High.
R42045	Figure 6-35	Medium	PALM: Surface survey recommended. No deep reconnaissance recommended.
			CDMS Historic: Medium. CDMS Prehistoric: Medium - High.
			Archaeological sites 41MQ246, 41MQ247, and 41MQ300 are located nearby.
R42046B	Figure 6-35	Medium	PALM - No survey recommended.
			CDMS Historic: Low, High. CDMS Prehistoric: Low, High.
			Archaeological sites 41MQ246, 41MQ247, and 41MQ300 are located nearby.
R42067	Figure 6-35	Medium	PALM - No survey recommended.
			CDMS Historic: Medium. CDMS Prehistoric: High.
			Archaeological sites 41MQ246, 41MQ247, and 41MQ300 are located nearby.
R42070	Figure 6-35	Medium	PALM - No survey recommended.
			CDMS Historic: Low - Medium. CDMS Prehistoric: Low, High.
			Archaeological sites 41MQ246, 41MQ247, and 41MQ300 are located nearby.
R42073	Figure 6-35	Medium	PALM - No survey recommended.
			CDMS Historic: Medium. CDMS Prehistoric: High.
			Archaeological sites 41MQ246, 41MQ247, and 41MQ300 are located nearby.
R42074	Figure 6-35	-	PALM - No survey recommended.
			CDMS Historic: Low - Medium. CDMS Prehistoric: Low, High.
			Archaeological sites 41MQ246, 41MQ247, and 41MQ300 are located nearby.

Property Identification Number (PIN)	Figure	Site Probability	Comment
			Portion of parcel within APE has been heavily disturbed by industrial development.
R42075	Figure 6-35	Medium	PALM - No survey recommended.
			CDMS Historic: Low - Medium. CDMS Prehistoric: Low, High.
			Archaeological sites 41MQ246, 41MQ247, and 41MQ300 are located nearby.
R42126	Figure 6-35	Low	PALM: Surface survey recommended. Deep reconnaissance recommended if deep impacts occur. / Surface survey recommended. No deep reconnaissance recommended.
			CDMS Historic: Medium. CDMS Prehistoric: Medium - High.
			Archaeological sites 41MQ246, 41MQ247, and 41MQ300 are located nearby.
			Portion of parcel within APE has been impacted by residential development.
R42131	Figure 6-35	-	PALM: Surface survey recommended. Deep reconnaissance recommended if deep impacts occur. / Surface survey recommended. No deep reconnaissance recommended.
			CDMS Historic: Medium. CDMS Prehistoric: Medium - High.
			Archaeological sites 41MQ246, 41MQ247, and 41MQ300 are located nearby.
			Portion of parcel within APE has been heavily impacted by industrial development.
R42134	Figure 6-35	Medium	PALM - No survey recommended.
			CDMS Historic: Medium. CDMS Prehistoric: High.
			Archaeological sites 41MQ246, 41MQ247, and 41MQ300 are located nearby.
R42136	Figure 6-35	Medium	PALM - No survey recommended.
			CDMS Historic: Medium. CDMS Prehistoric: High.
			Archaeological sites 41MQ246, 41MQ247, and 41MQ300 are located nearby.
R42161	Figure 6-35	Medium	PALM - No survey recommended.
			CDMS Historic: Medium. CDMS Prehistoric: High.
			Archaeological sites 41MQ246, 41MQ247, and 41MQ300 are located nearby.
R77385	Figure 6-35	-	Outside existing Segment H alignment.
R42082	Figure 6-35, Figure 6-36	Medium	PALM: Surface survey recommended. No deep reconnaissance recommended.

Property Identification Number (PIN)	Figure	Site Probability	Comment
			CDMS Historic: Medium. CDMS Prehistoric: Medium - High.
			Archaeological sites 41MQ246, 41MQ247, and 41MQ300 are located nearby.
R42084	Figure 6-35, Figure 6-36	Low	PALM: Surface survey recommended. No deep reconnaissance recommended.
			CDMS Historic: Medium. CDMS Prehistoric: Medium - High.
			Archaeological sites 41MQ246, 41MQ247, and 41MQ300 are located nearby.
			Portion inside APE has been developed. Residential yard.
R42085	Figure 6-35, Figure 6-36	Low	PALM: Surface survey recommended. No deep reconnaissance recommended.
			CDMS Historic: Medium. CDMS Prehistoric: Medium - High.
			Archaeological sites 41MQ246, 41MQ247, and 41MQ300 are located nearby.
			Portion inside APE has been developed. Residential yard.
R42118	Figure 6-35, Figure 6-36	Low	PALM - No survey recommended.
			CDMS Historic: Medium. CDMS Prehistoric: Medium - High.
			Archaeological sites 41MQ246, 41MQ247, and 41MQ300 are located nearby.
			Portion inside APE has been developed. Residential yard.
R108191	Figure 6-36	-	Outside existing Segment H alignment.
R108192	Figure 6-36	-	Outside existing Segment H alignment.
R108193	Figure 6-36	-	Outside existing Segment H alignment.
R108194	Figure 6-36	-	Outside existing Segment H alignment.
R108195	Figure 6-36	-	Outside existing Segment H alignment.
R42092	Figure 6-36	Low	PALM: Surface survey recommended. Deep reconnaissance recommended if deep impacts occur.
			CDMS Historic: Low - Medium. CDMS Prehistoric: Low, High.
			Area within APE has been disturbed by residential and agricultural related activity.
R42094	Figure 6-36	Low	PALM: Surface survey recommended. Deep reconnaissance recommended if deep impacts occur.
			CDMS Historic: Low - Medium. CDMS Prehistoric: Low, High.
			Area inside APE has been developed for commercial use.
R42096	Figure 6-36	Low	PALM: Surface survey recommended. Deep reconnaissance recommended if deep impacts occur.

Property Identification Number (PIN)	Figure	Site Probability	Comment
			CDMS Historic: Medium. CDMS Prehistoric: High.
			Area inside APE has been developed for use as a trailer lot.
R42137	Figure 6-36	Low	PALM - No survey recommended.
			CDMS Historic: Medium. CDMS Prehistoric: High.
			Archaeological sites 41MQ246, 41MQ247, and 41MQ300 are located nearby.
			Portion inside APE has been developed. Residential yard.
R69387	Figure 6-36	Low	PALM - No survey recommended.
			CDMS Historic: Medium. CDMS Prehistoric: Medium - High.
			Archaeological sites 41MQ246, 41MQ247, and 41MQ300 are located nearby.
			Portion inside APE has been developed. Residential yard.
R69391	Figure 6-36	Low	PALM: Surface survey recommended. Deep reconnaissance recommended if deep impacts occur. / Surface survey recommended. No deep reconnaissance recommended. / No survey recommended.
			CDMS Historic: Medium. CDMS Prehistoric: Medium.
			Archaeological sites 41MQ246, 41MQ247, and 41MQ300 are located nearby.
			Portion inside APE has been developed. Residential yard.
R69392	Figure 6-36	Medium	PALM - No survey recommended.
			CDMS Historic: Medium. CDMS Prehistoric: High.
			Archaeological sites 41MQ246, 41MQ247, and 41MQ300 are located nearby.
			Portion inside APE has been developed. Residential yard.

Table 6-8. Harris County Parcels not Tested.

Property Identification Number (PIN)	Figure	Site Probability	Comment
0432250000001	Figure 6-36	Medium	PALM: Surface survey recommended. Deep reconnaissance recommended if deep impacts occur. / Surface survey recommended. No deep reconnaissance recommended. / No surface survey recommended. Deep reconnaissance recommended only if severe impacts are anticipated. / No survey recommended.
			CDMS Historic: Low - High. CDMS Prehistoric: Low, High.
0432250000020	Figure 6-36	Low	PALM: Surface survey recommended. Deep reconnaissance recommended if deep impacts occur.
			CDMS Historic: Low. CDMS Prehistoric: Low.
0432250000006	Figure 6-36, Figure 6-37	Medium	PALM: Surface survey recommended. No deep reconnaissance recommended. / Surface survey of mounds only. No deep reconnaissance recommended.
			CDMS Historic: Low - High. CDMS Prehistoric: Low - High.
0432250000003	Figure 6-37	High	PALM: Surface survey of mounds only. No deep reconnaissance recommended.
			CDMS Historic: High. CDMS Prehistoric: High.
0432250000008	Figure 6-37	High	PALM: Surface survey of mounds only. No deep reconnaissance recommended.
			CDMS Historic: High. CDMS Prehistoric: High.

Table 6-9. Liberty County Parcels not Tested.

Property Identification Number (PIN)	Figure	Site Probability	Comment
26716	Figure 6-37	Medium	CDMS Historic: Medium - High. CDMS Prehistoric: Low, High.
29668	Figure 6-37, Figure 6-38	Medium	CDMS Historic: Medium - High. CDMS Prehistoric: Low - High.
31635	Figure 6-37, Figure 6-38	Medium	CDMS Historic: Medium - High. CDMS Prehistoric: Low - Medium.
30769	Figure 6-38	Medium	CDMS Historic: Medium - High. CDMS Prehistoric: Low - Medium.
26617	Figure 6-38, Figure 6-39	Medium	CDMS Historic: Low - High. CDMS Prehistoric: Low - High.
28559	Figure 6-38, Figure 6-39	Medium	CDMS Historic: Low - High. CDMS Prehistoric: Low - High.
15703	Figure 6-39	Medium	CDMS Historic: Low - High. CDMS Prehistoric: Low - Medium. Partially surveyed by Ferguson et al. 2012.
15703	Figure 6-39	Medium	CDMS Historic: Low - High. CDMS Prehistoric: Low - Medium. Partially surveyed by Ferguson et al. 2012.
15710	Figure 6-39	Medium	CDMS Historic: Medium. CDMS Prehistoric: Medium.
28559	Figure 6-39	Medium	CDMS Historic: Low - Medium. CDMS Prehistoric: Low - High.
177030	Figure 6-39	Medium	CDMS Historic: Low - Medium. CDMS Prehistoric: Low - Medium.
177032	Figure 6-39	Medium	CDMS Historic: Medium. CDMS Prehistoric: Medium.
15702	Figure 6-39, Figure 6-40	Medium	CDMS Historic: Low - Medium. CDMS Prehistoric: Low - Medium.
15703	Figure 6-39, Figure 6-40	Medium	CDMS Historic: Low - High. CDMS Prehistoric: Low - Medium. Partially surveyed by Ferguson et al. 2012.
31028	Figure 6-39, Figure 6-40	Medium	CDMS Historic: Low - Medium. CDMS Prehistoric: Low - High.
29897	Figure 6-40	Medium	CDMS Historic: Low - Medium. CDMS Prehistoric: Low - High.
29901	Figure 6-40	Low	CDMS Historic: Low. CDMS Prehistoric: Low.

Property Identification Number (PIN)	Figure	Site Probability	Comment
29915	Figure 6-40	Medium	CDMS Historic: Medium. CDMS Prehistoric: Medium.
102052	Figure 6-40	Medium	CDMS Historic: Low - Medium. CDMS Prehistoric: Low - Medium.
214066	Figure 6-40	Medium	CDMS Historic: Medium. CDMS Prehistoric: Medium.
214068	Figure 6-40	Medium	CDMS Historic: Medium. CDMS Prehistoric: Medium.
214069	Figure 6-40	Medium	CDMS Historic: Medium. CDMS Prehistoric: Medium.
214070	Figure 6-40	Medium	CDMS Historic: Medium. CDMS Prehistoric: Medium.
214072	Figure 6-40	Medium	CDMS Historic: Medium. CDMS Prehistoric: Medium.
30318	Figure 6-40, Figure 6-41	Low	CDMS Historic: Low. CDMS Prehistoric: Low.
30333	Figure 6-40, Figure 6-41	High	CDMS Historic: High. CDMS Prehistoric: High.
30334	Figure 6-40, Figure 6-41	Low	CDMS Historic: Low. CDMS Prehistoric: Low.
53686	Figure 6-40, Figure 6-41	High	CDMS Historic: Low - High. CDMS Prehistoric: Low - High.
53686	Figure 6-40, Figure 6-41	Medium	CDMS Historic: Low - High. CDMS Prehistoric: Low - High.
53686	Figure 6-40, Figure 6-41	Medium	CDMS Historic: Low - High. CDMS Prehistoric: Low - High.
53686	Figure 6-40, Figure 6-41	Medium	CDMS Historic: Low - High. CDMS Prehistoric: Low - High.
53686	Figure 6-40, Figure 6-41	Medium	CDMS Historic: Low - High. CDMS Prehistoric: Low - High.
53686	Figure 6-40, Figure 6-41	Medium	CDMS Historic: Low - High. CDMS Prehistoric: Low - High.
108080	Figure 6-40, Figure 6-41	Medium	CDMS Historic: Low - High. CDMS Prehistoric: Low - High.
25413	Figure 6-41	Medium	CDMS Historic: High. CDMS Prehistoric: Medium.
25414	Figure 6-41	Medium	CDMS Historic: High. CDMS Prehistoric: High - Medium.
30273	Figure 6-41	Medium	CDMS Historic: High. CDMS Prehistoric: Medium.

Property Identification Number (PIN)	Figure	Site Probability	Comment
30318	Figure 6-41	Medium	CDMS Historic: Low - High. CDMS Prehistoric: Low - Medium.
30336	Figure 6-41	Medium	CDMS Historic: Low - High. CDMS Prehistoric: Low - High.
30337	Figure 6-41	High	CDMS Historic: High. CDMS Prehistoric: High.
30350	Figure 6-41	-	CDMS Historic: High. CDMS Prehistoric: Medium.
			Area inside APE is an access road.
53686	Figure 6-41	Medium	CDMS Historic: Low - High. CDMS Prehistoric: Low - High.
53686	Figure 6-41	Medium	CDMS Historic: Low - High. CDMS Prehistoric: Low - High.
53686	Figure 6-41	Medium	CDMS Historic: Low - High. CDMS Prehistoric: Low - High.
53686	Figure 6-41	Medium	CDMS Historic: Low - High. CDMS Prehistoric: Low - High.
53686	Figure 6-41	Medium	CDMS Historic: Low - High. CDMS Prehistoric: Low - High.
53686	Figure 6-41	Medium	CDMS Historic: Low - High. CDMS Prehistoric: Low - High.
53686	Figure 6-41	Medium	CDMS Historic: Low - High. CDMS Prehistoric: Low - High.
53686	Figure 6-41	Medium	CDMS Historic: Low - High. CDMS Prehistoric: Low - High.
53686	Figure 6-41	Medium	CDMS Historic: Low - High. CDMS Prehistoric: Low - High.
152973	Figure 6-41	Medium	CDMS Historic: High. CDMS Prehistoric: Medium.
172041	Figure 6-41	Low	CDMS Historic: Medium - High. CDMS Prehistoric: Low - Medium.
			Area within APE has been disturbed by residential and agricultural related activity.
172497	Figure 6-41	Low	CDMS Historic: Medium - High. CDMS Prehistoric: Low - Medium.
			Area within APE has been disturbed by residential and agricultural related activity.
172498	Figure 6-41	Medium	CDMS Historic: High. CDMS Prehistoric: Medium.

Property Identification Number (PIN)	Figure	Site Probability	Comment
173059	Figure 6-41	Medium	CDMS Historic: Medium - High. CDMS Prehistoric: Low - Medium.
			Entry Denied
176832	Figure 6-41	Medium	CDMS Historic: High. CDMS Prehistoric: Medium.
179618	Figure 6-41	Low	CDMS Historic: High. CDMS Prehistoric: Medium.
			Area within APE has been disturbed by residential and agricultural related activity.
153765	Figure 6-41, Figure 6-42	Medium	CDMS Historic: High. CDMS Prehistoric: Medium.
167683	Figure 6-41, Figure 6-42	Medium	CDMS Historic: High. CDMS Prehistoric: Medium.
169053	Figure 6-41, Figure 6-42	Medium	CDMS Historic: High. CDMS Prehistoric: Medium.
25200	Figure 6-42	Medium	CDMS Historic: Medium. CDMS Prehistoric: Medium.
30206	Figure 6-42	Medium	CDMS Historic: Medium. CDMS Prehistoric: Medium.
30230	Figure 6-42	Medium	CDMS Historic: Medium. CDMS Prehistoric: Medium.
69492	Figure 6-42	Medium	CDMS Historic: Medium. CDMS Prehistoric: Medium.
69502	Figure 6-42	Medium	CDMS Historic: Medium - High. CDMS Prehistoric: Medium.
102327	Figure 6-42	Medium	CDMS Historic: Medium. CDMS Prehistoric: Medium.
102327	Figure 6-42	Medium	CDMS Historic: Medium. CDMS Prehistoric: Medium.
102327	Figure 6-42	Medium	CDMS Historic: Medium. CDMS Prehistoric: Medium.
113472	Figure 6-42	Medium	CDMS Historic: Medium. CDMS Prehistoric: Medium.
121732	Figure 6-42	Low	CDMS Historic: Medium. CDMS Prehistoric: Medium.
			Portion inside APE has been developed. Residential yard.
128292	Figure 6-42	Medium	CDMS Historic: Medium - High. CDMS Prehistoric: Medium - High.
128292	Figure 6-42	Medium	CDMS Historic: Medium - High. CDMS Prehistoric: Medium - High.

Property Identification Number (PIN)	Figure	Site Probability	Comment
69502	Figure 6-42, Figure 6-43	Medium	CDMS Historic: Medium - High. CDMS Prehistoric: Medium.
69502	Figure 6-42, Figure 6-43	Medium	CDMS Historic: Medium - High. CDMS Prehistoric: Medium.
31810	Figure 6-42, Figure 6-43	Low	CDMS Historic: Low - High. CDMS Prehistoric: Medium – High.
			Mostly surveyed by Wilcox et al. 2007
			Portion within APE is a rice field.
			Entry Denied
69474	Figure 6-43	Medium	CDMS Historic: High. CDMS Prehistoric: Medium – High.
69474	Figure 6-43	Medium	CDMS Historic: High. CDMS Prehistoric: Medium – High.
69491	Figure 6-43	Medium	CDMS Historic: High. CDMS Prehistoric: Medium.
69553	Figure 6-43	Medium	CDMS Historic: High. CDMS Prehistoric: Medium.
69553	Figure 6-43	Medium	CDMS Historic: High. CDMS Prehistoric: Medium.
69557	Figure 6-43	High	CDMS Historic: High. CDMS Prehistoric: High.
69557	Figure 6-43	High	CDMS Historic: High. CDMS Prehistoric: High.
69557	Figure 6-43	High	CDMS Historic: High. CDMS Prehistoric: High.
69558	Figure 6-43	-	CDMS Historic: High. CDMS Prehistoric: High.
			Portion inside APE has been developed.
69558	Figure 6-43	-	CDMS Historic: High. CDMS Prehistoric: High.
			Portion inside APE has been developed.
69560	Figure 6-43	High	CDMS Historic: High. CDMS Prehistoric: High.
69562	Figure 6-43	High	CDMS Historic: High. CDMS Prehistoric: High.
120208	Figure 6-43	High	CDMS Historic: High. CDMS Prehistoric: High.
134420	Figure 6-43	Low	CDMS Historic: High. CDMS Prehistoric: High.

Property Identification Number (PIN)	Figure	Site Probability	Comment
			Portion inside APE has been developed. Residential yard.
134421	Figure 6-43	Low	CDMS Historic: High. CDMS Prehistoric: High.
			Portion inside APE has been developed. Residential yard.
134422	Figure 6-43	Low	CDMS Historic: High. CDMS Prehistoric: High.
			Portion inside APE has been developed. Residential Yard
134424	Figure 6-43	Low	CDMS Historic: High. CDMS Prehistoric: Medium - High.
			Portion inside APE has been developed. Residential Yard.
134425	Figure 6-43	Low	CDMS Historic: High. CDMS Prehistoric: Medium.
			Portion inside APE has been developed. Residential Yard.
134426	Figure 6-43	Low	CDMS Historic: High. CDMS Prehistoric: Medium.
			Portion inside APE has been developed. Residential yard.
134427	Figure 6-43	Low	CDMS Historic: High. CDMS Prehistoric: Medium.
			Portion inside APE has been developed. Residential yard.
134428	Figure 6-43	Medium	CDMS Historic: High. CDMS Prehistoric: Medium.
			Portion inside APE has been developed. Residential yard.
134429	Figure 6-43	Low	CDMS Historic: High. CDMS Prehistoric: Medium.
			Portion inside APE has been developed. Residential yard.
134430	Figure 6-43	Low	CDMS Historic: High. CDMS Prehistoric: Medium.
			Portion inside APE has been developed. Residential yard.
134431	Figure 6-43	Low	CDMS Historic: High. CDMS Prehistoric: Medium.
			Portion inside APE has been developed. Residential yard.
134463	Figure 6-43	Low	CDMS Historic: High. CDMS Prehistoric: Medium.
			Portion inside APE has been developed. Residential yard.
134465	Figure 6-43	Low	CDMS Historic: High. CDMS Prehistoric: Medium.
			Portion inside APE has been developed. Residential yard.
134466	Figure 6-43	Low	CDMS Historic: High. CDMS Prehistoric: Medium.

Property Identification Number (PIN)	Figure	Site Probability	Comment
			Portion inside APE has been developed. Residential yard.
134467	Figure 6-43	Low	CDMS Historic: High. CDMS Prehistoric: Medium.
			Portion inside APE has been developed. Residential yard.
137357	Figure 6-43	Medium	CDMS Historic: High. CDMS Prehistoric: Medium.
142388	Figure 6-43	High	CDMS Historic: High. CDMS Prehistoric: High.
135967	Figure 6-43	High	CDMS Historic: High. CDMS Prehistoric: High.
201060	Figure 6-43, Figure 6-44	Medium	CDMS Historic: High. CDMS Prehistoric: Medium - High.
			Entry Denied
167361	Figure 6-44	Medium	CDMS Historic: Low - Medium. CDMS Prehistoric: Low - High.
201060	Figure 6-44	Medium	CDMS Historic: High. CDMS Prehistoric: Medium - High.
			Entry Denied
201060	Figure 6-44	Medium	CDMS Historic: High. CDMS Prehistoric: Medium - High.
			Entry Denied
201190	Figure 6-44	Medium	CDMS Historic: Medium - High. CDMS Prehistoric: Low – High.
			Entry Denied
169019	Figure 6-44, Figure 6-45	Medium	CDMS Historic: High. CDMS Prehistoric: Medium.
17098	Figure 6-46	Medium	CDMS Historic: High. CDMS Prehistoric: Medium - High.
28413	Figure 6-47	Medium	CDMS Historic: Medium - High. CDMS Prehistoric: Low - Medium.
			Partially surveyed by Wilcox et al. 2007.
			Entry Denied
30950	Figure 6-47	-	CDMS Historic: High. CDMS Prehistoric: Medium.
			Irrigation canal.
30952	Figure 6-47	-	CDMS Historic: High. CDMS Prehistoric: Medium.
			Irrigation canal.

Property Identification Number (PIN)	Figure	Site Probability	Comment
30985	Figure 6-48	Medium	CDMS Historic: High. CDMS Prehistoric: Medium.
			Entry Denied
30986	Figure 6-48	Medium	CDMS Historic: Medium - High. CDMS Prehistoric: Low - Medium.
			Partially surveyed by an unknown author 1978.
31311	Figure 6-48	Medium	CDMS Historic: High. CDMS Prehistoric: Medium.
			Entry Denied
31312	Figure 6-48	Medium	CDMS Historic: High. CDMS Prehistoric: Medium.
			Partially surveyed by an unknown author 1978.
109302	Figure 6-48	Medium	CDMS Historic: High. CDMS Prehistoric: Medium.
			Completely surveyed by an unknown author 1978.
167728	Figure 6-48	Medium	CDMS Historic: High. CDMS Prehistoric: Medium.
167729	Figure 6-48	Medium	CDMS Historic: High. CDMS Prehistoric: Medium.
			Completely surveyed by Wilcox et al. 2007.
			Entry Denied
167731	Figure 6-48	Medium	CDMS Historic: High. CDMS Prehistoric: Medium.
167732	Figure 6-48	Medium	CDMS Historic: Medium - High. CDMS Prehistoric: Low - Medium.
			Entry Denied

Table 6-10. Chambers County Parcels not Tested.

Property Identification Number (PIN)	Figure	Site Probability	Comment
1878	Figure 6-48	-	CDMS Historic: Medium - High. CDMS Prehistoric: Low - Medium. Irrigation Canal. Entry Denied
4715	Figure 6-48	Medium	CDMS Historic: Medium - High. CDMS Prehistoric: Low - Medium.
4724	Figure 6-48	Medium	CDMS Historic: Medium - High. CDMS Prehistoric: Low - High. Partially surveyed by Perttula and Nelson 2008.
4724	Figure 6-48	Medium	CDMS Historic: Medium - High. CDMS Prehistoric: Low - High. Completely surveyed by Perttula and Nelson 2008.
5910	Figure 6-48	Medium	CDMS Historic: High. CDMS Prehistoric: Medium - High.
17107	Figure 6-48	Medium	CDMS Historic: Medium - High. CDMS Prehistoric: Low - Medium.
20582	Figure 6-48	Medium	CDMS Historic: High. CDMS Prehistoric: Medium - High.
21415	Figure 6-48	Medium	CDMS Historic: High. CDMS Prehistoric: Medium - High.
27619	Figure 6-48	-	CDMS Historic: Medium - High. CDMS Prehistoric: Low - High. Area within APE has been developed.
36261	Figure 6-48	Medium	CDMS Historic: High. CDMS Prehistoric: Medium. Completely surveyed by an unknown author 1978.
36262	Figure 6-48	Medium	CDMS Historic: High. CDMS Prehistoric: Medium.
1161	Figure 6-49	Medium	CDMS Historic: High. CDMS Prehistoric: Medium.
1169	Figure 6-49	Medium	CDMS Historic: Medium - High. CDMS Prehistoric: Low - Medium. Mostly surveyed by Crow and Falcon 2008.
1169	Figure 6-49	Medium	CDMS Historic: Medium - High. CDMS Prehistoric: Low - Medium. Mostly surveyed by Crow and Falcon 2008.
5049	Figure 6-49	Medium	CDMS Historic: Medium - High. CDMS Prehistoric: Low - Medium.

Property Identification Number (PIN)	Figure	Site Probability	Comment
9233	Figure 6-49	Medium	CDMS Historic: High. CDMS Prehistoric: Medium.
			Partially surveyed by Crow and Falcon 2008.
20512	Figure 6-49	Low	CDMS Historic: High. CDMS Prehistoric: High.
			Completely surveyed by Perttula and Nelson 2008.
29663	Figure 6-49	Medium	CDMS Historic: Medium. CDMS Prehistoric: Low - Medium.
43601	Figure 6-49	Medium	Entry Denied
			CDMS Historic: High. CDMS Prehistoric: High.
5048	Figure 6-49, Figure 6-50	Medium	CDMS Historic: Medium - High. CDMS Prehistoric: Low - Medium.
19091	Figure 6-49, Figure 6-50	Medium	CDMS Historic: Medium - High. CDMS Prehistoric: Low - Medium.
11375	Figure 6-50	Medium	CDMS Historic: High. CDMS Prehistoric: Medium.
11376	Figure 6-50	Medium	CDMS Historic: High. CDMS Prehistoric: Medium.
28178	Figure 6-50	Medium	CDMS Historic: High. CDMS Prehistoric: Medium.
28179	Figure 6-50	Medium	CDMS Historic: High. CDMS Prehistoric: Medium.
29158	Figure 6-50	Medium	CDMS Historic: High. CDMS Prehistoric: Medium.

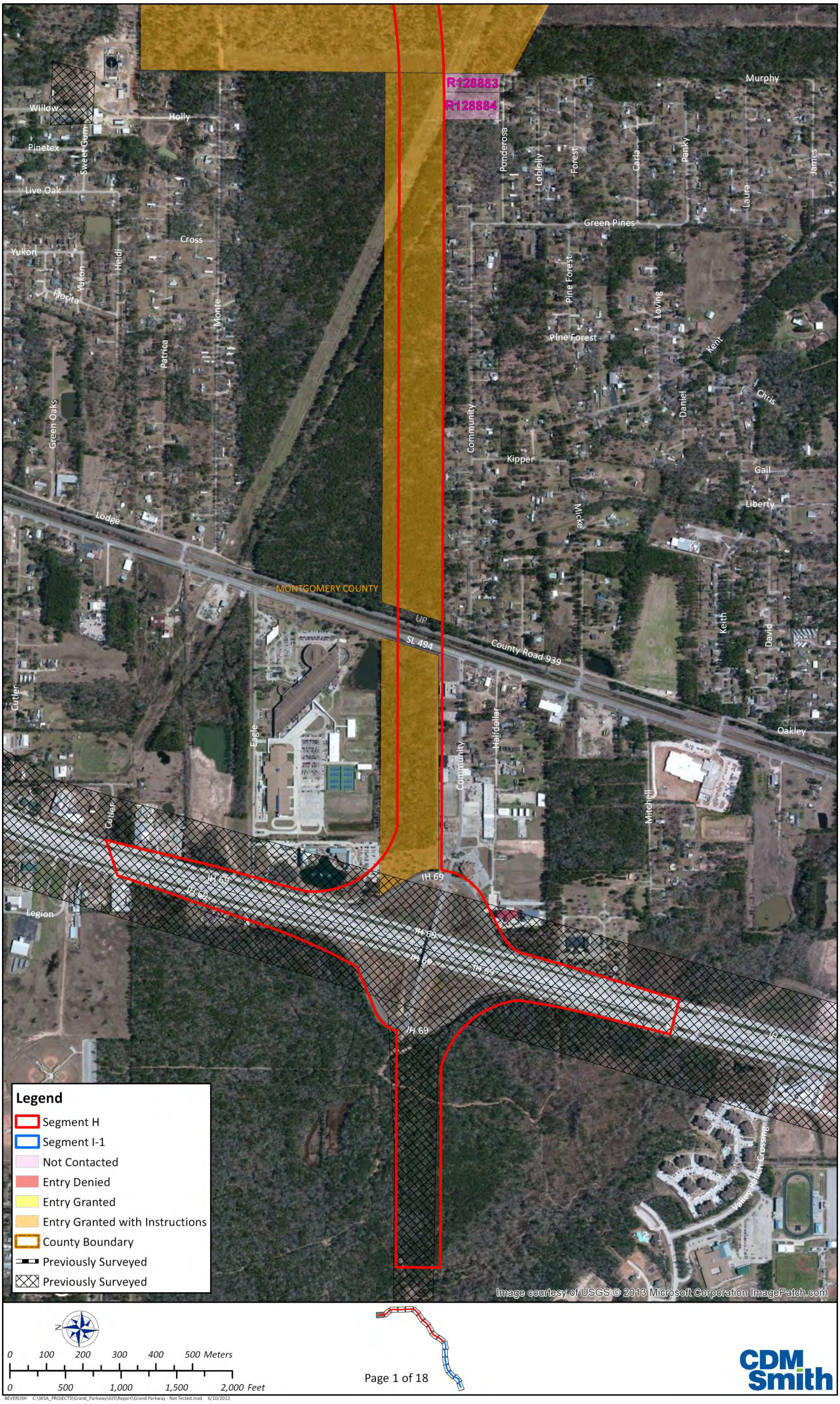


Figure 6-33. Parcels not Tested, Page 1 of 18.

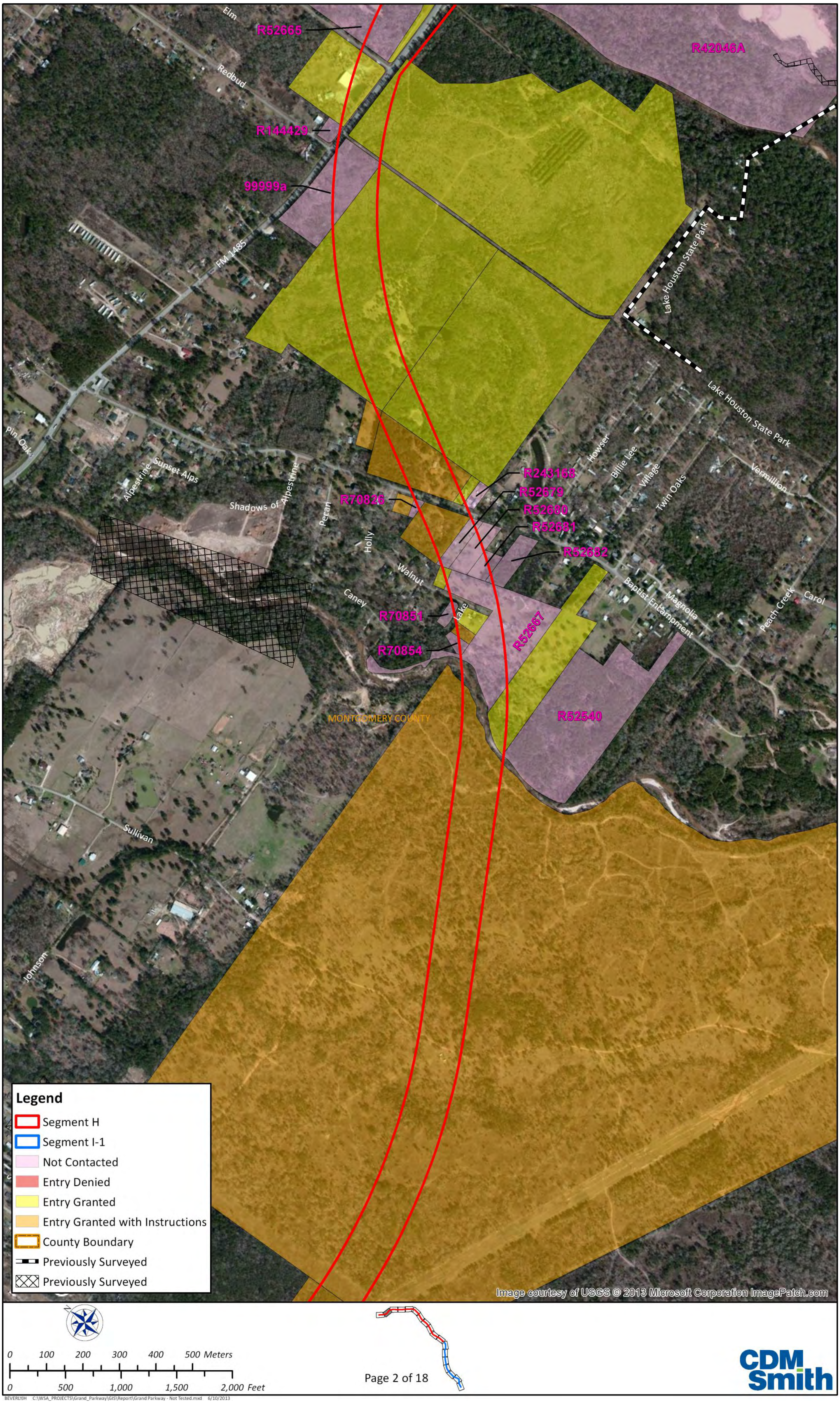


Figure 6-34. Parcels not Tested, Page 2 of 18.

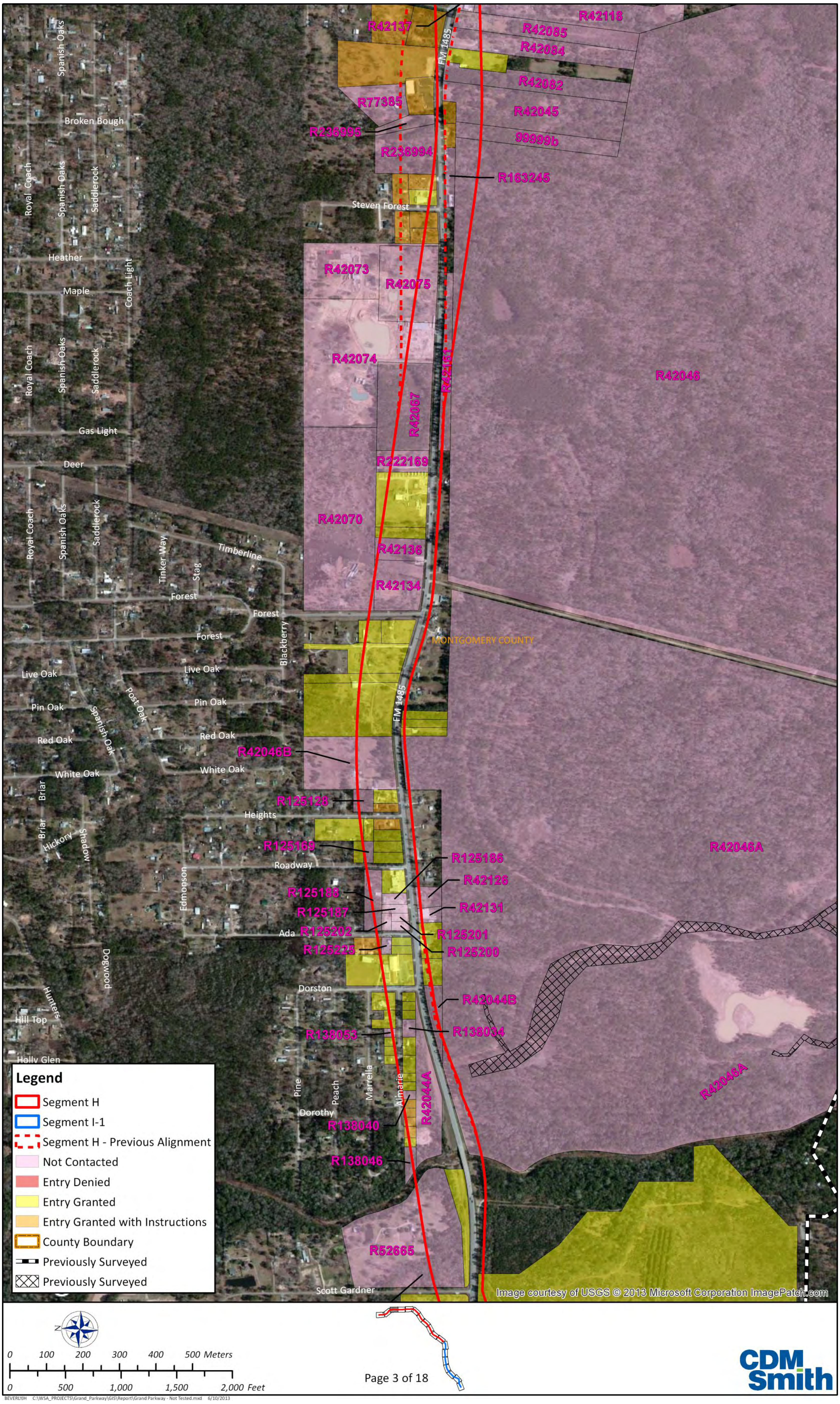


Figure 6-35. Parcels not Tested, Page 3 of 18.

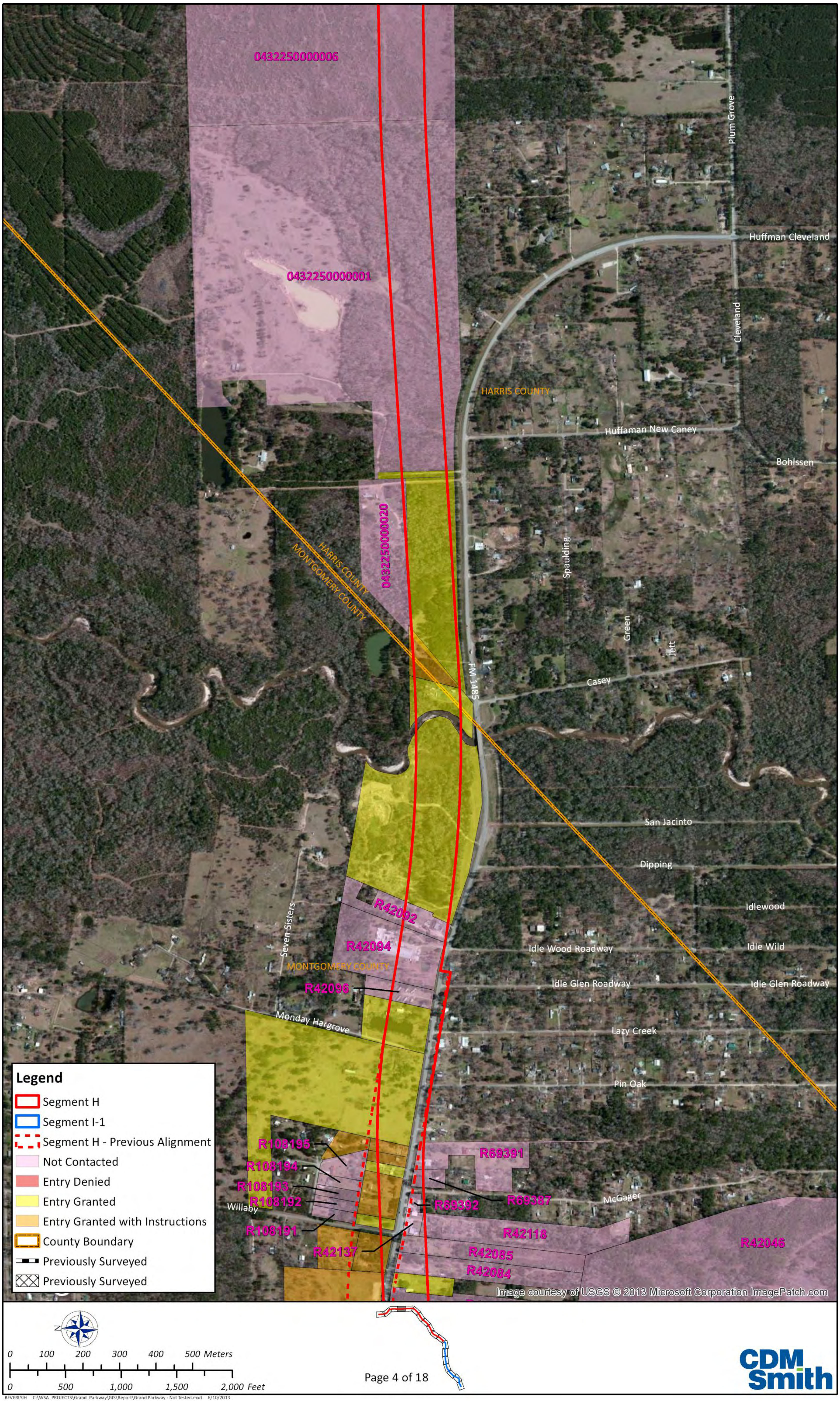


Figure 6-36. Parcels not Tested, Page 4 of 18.

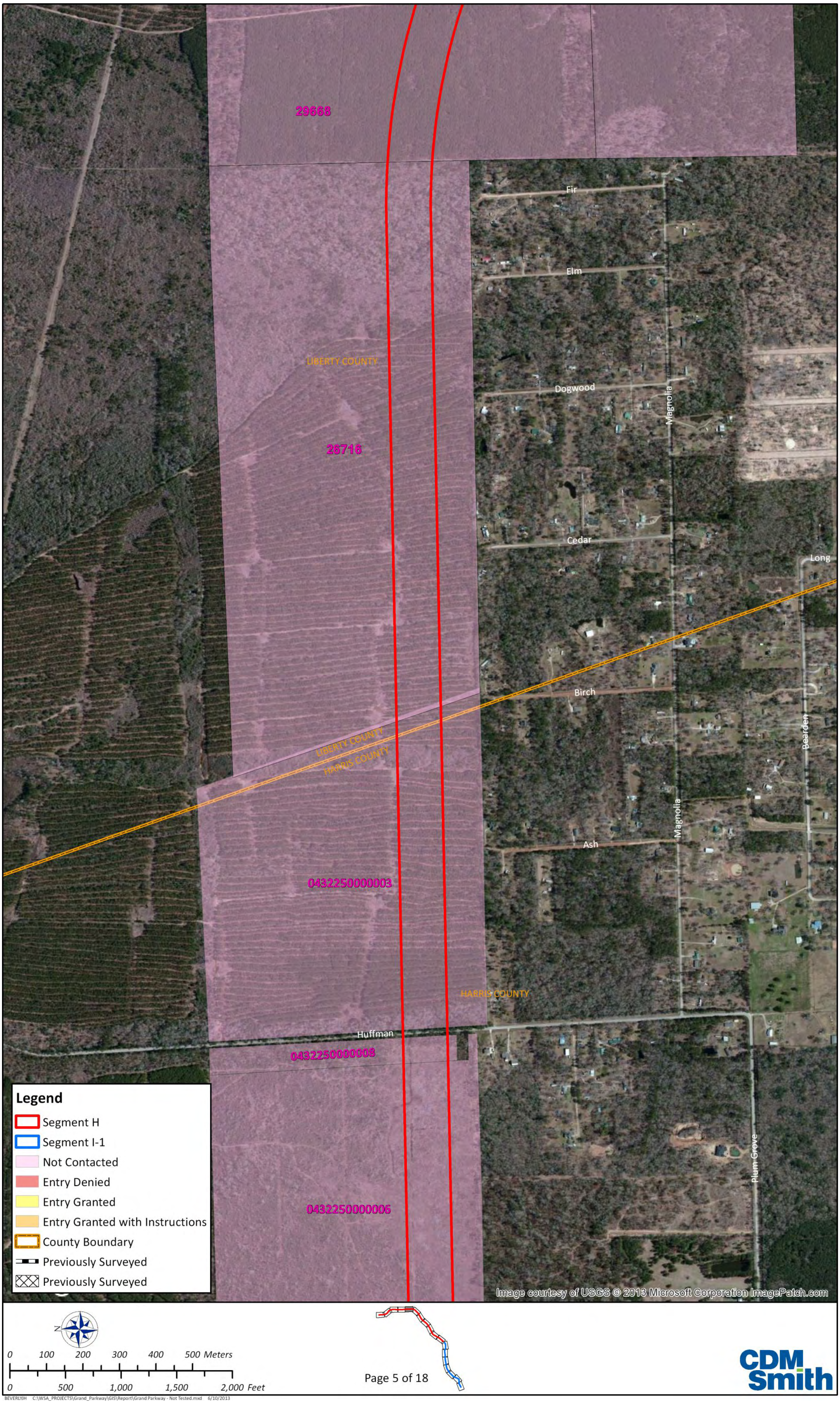


Figure 6-37. Parcels not Tested, Page 5 of 18.

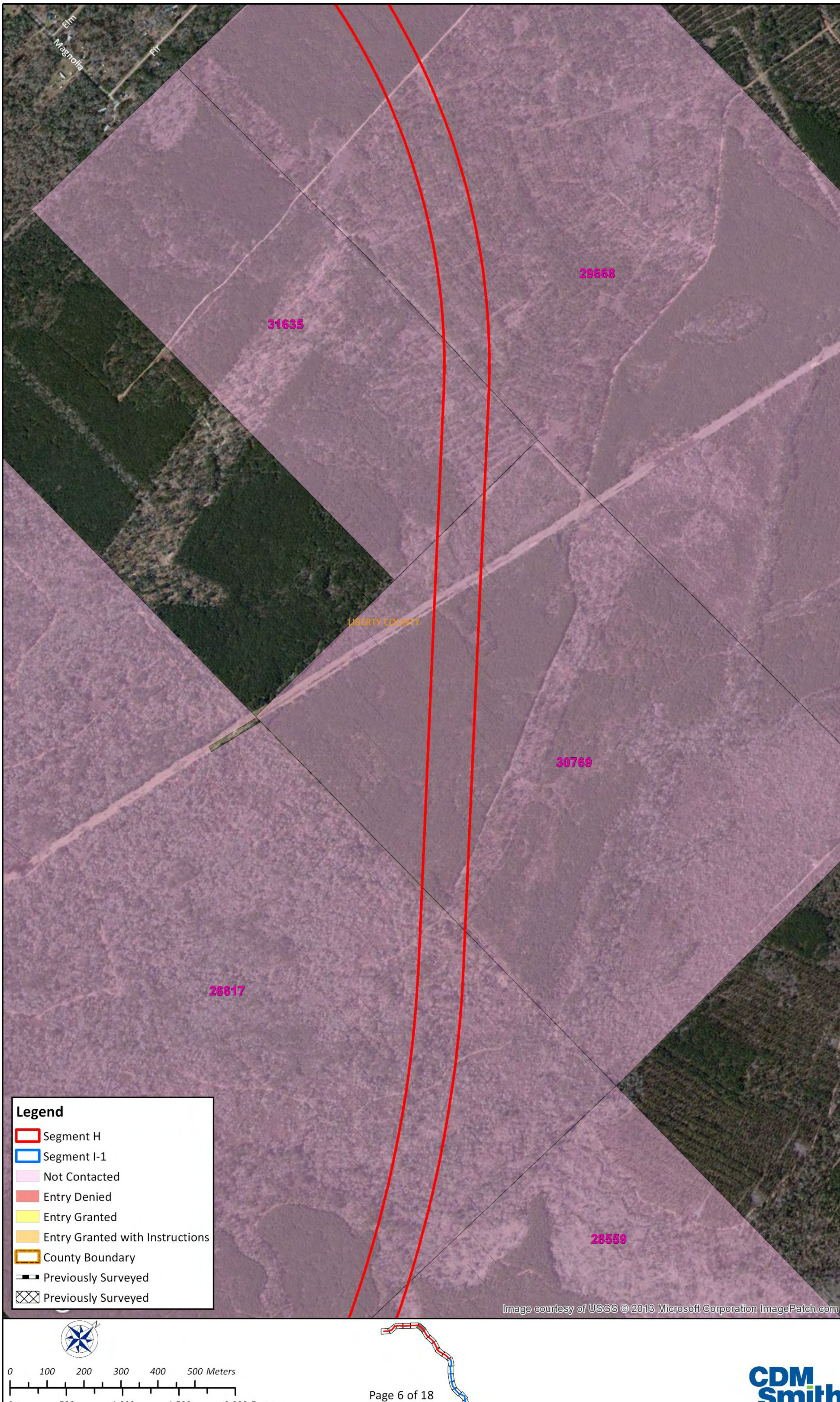


Figure 6-38. Parcels not Tested, Page 6 of 18.

Figure 6-39. Parcels not Tested, Page 7 of 18.

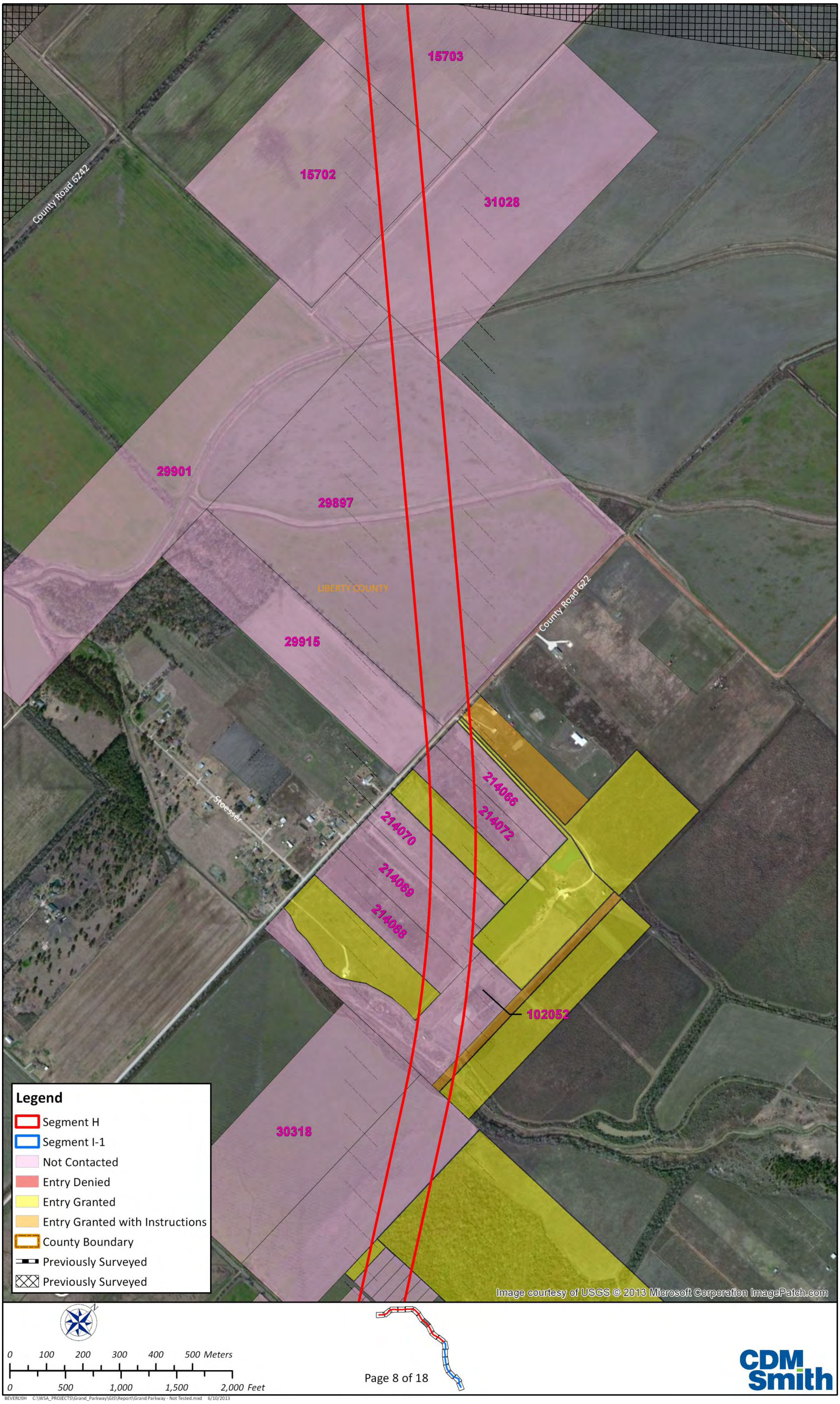


Figure 6-40. Parcels not Tested, Page 8 of 18.

Figure 6-41. Parcels not Tested, Page 9 of 18.

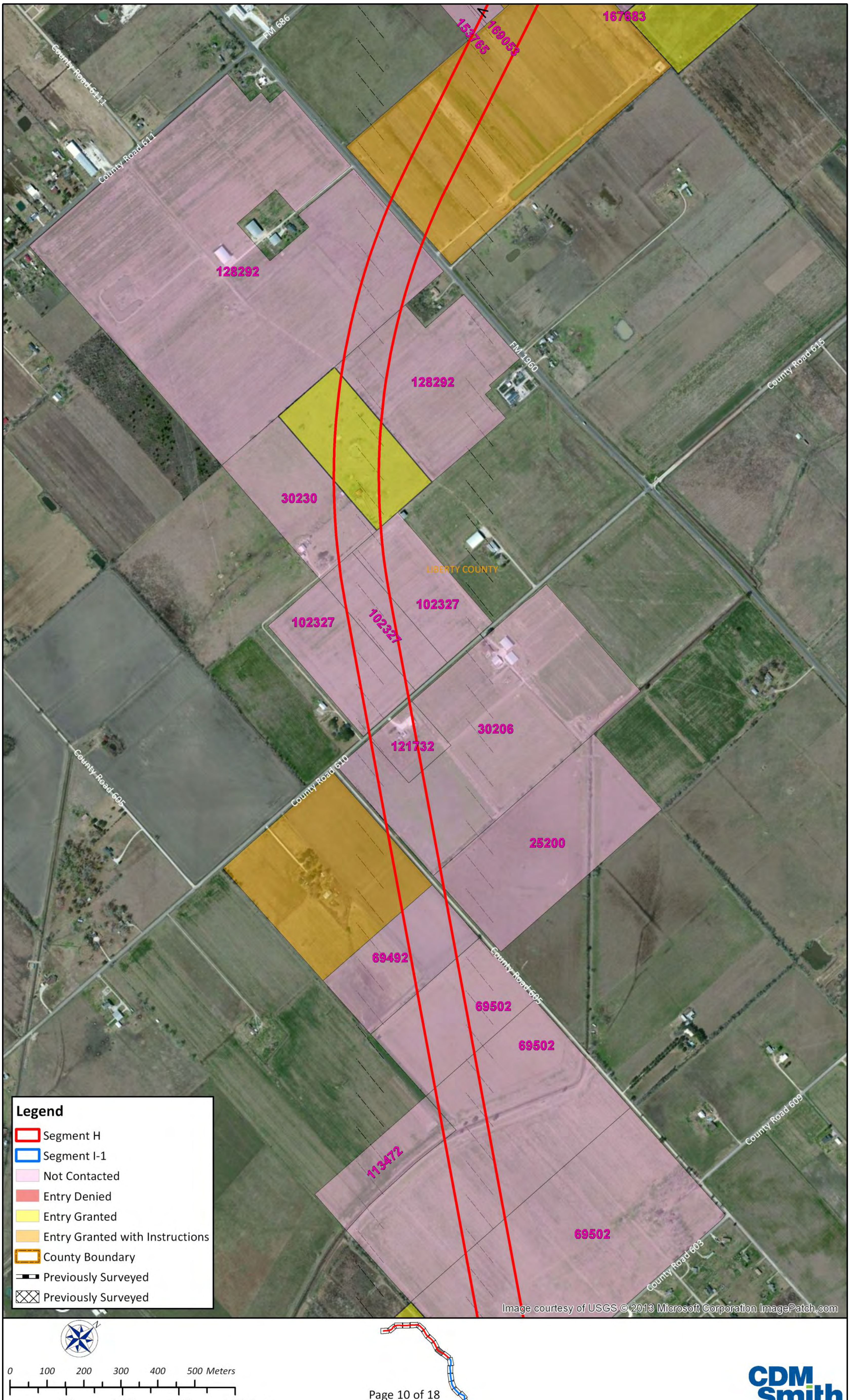


Figure 6-42. Parcels not Tested, Page 10 of 18.

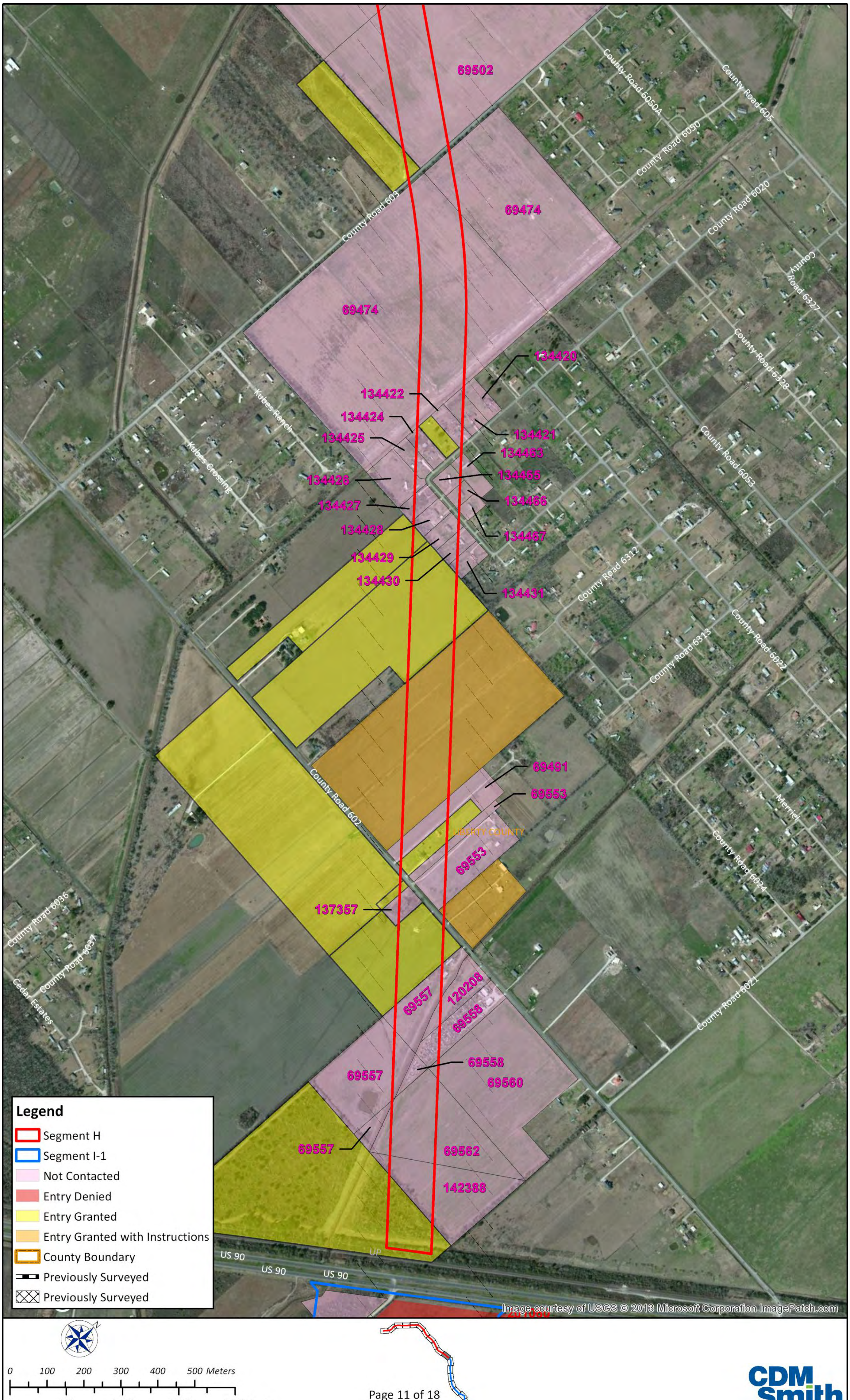


Figure 6-43. Parcels not Tested, Page 11 of 18.

Figure 6-44. Parcels not Tested, Page 12 of 18.

Figure 6-45. Parcels not Tested, Page 13 of 18.

Figure 6-46. Parcels not Tested, Page 14 of 18.

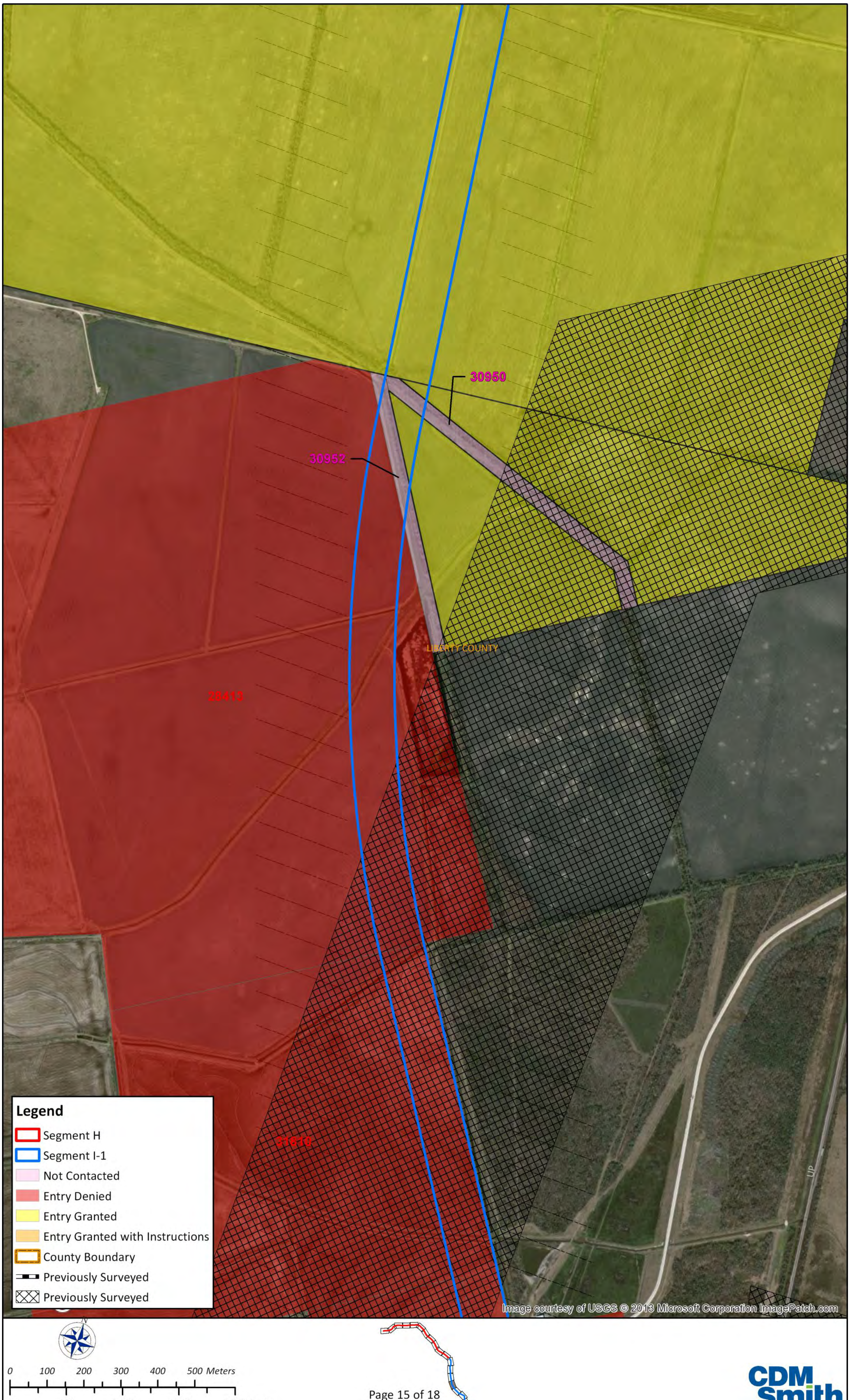


Figure 6-47. Parcels not Tested, Page 15 of 18.

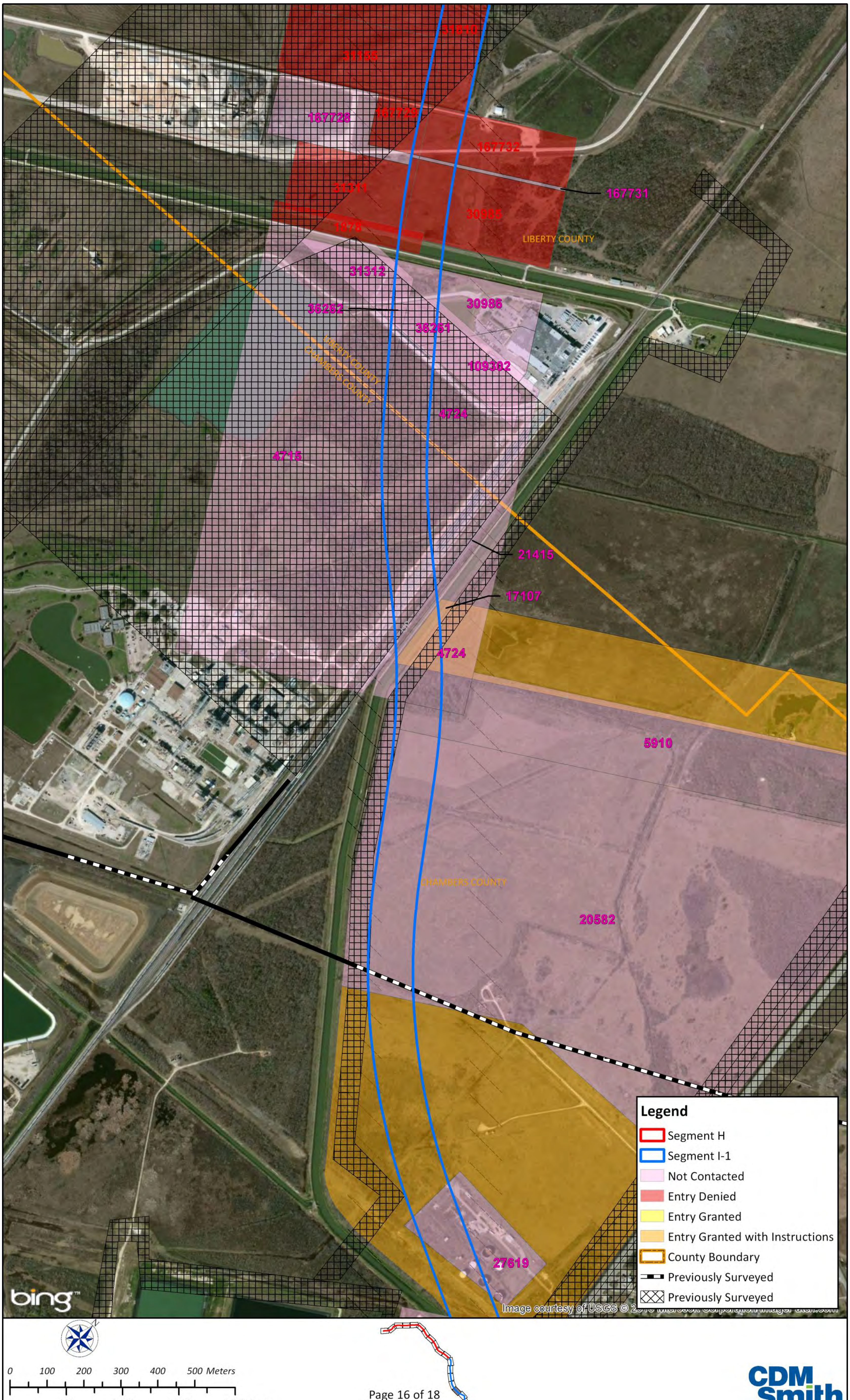


Figure 6-48. Parcels not Tested, Page 16 of 18.

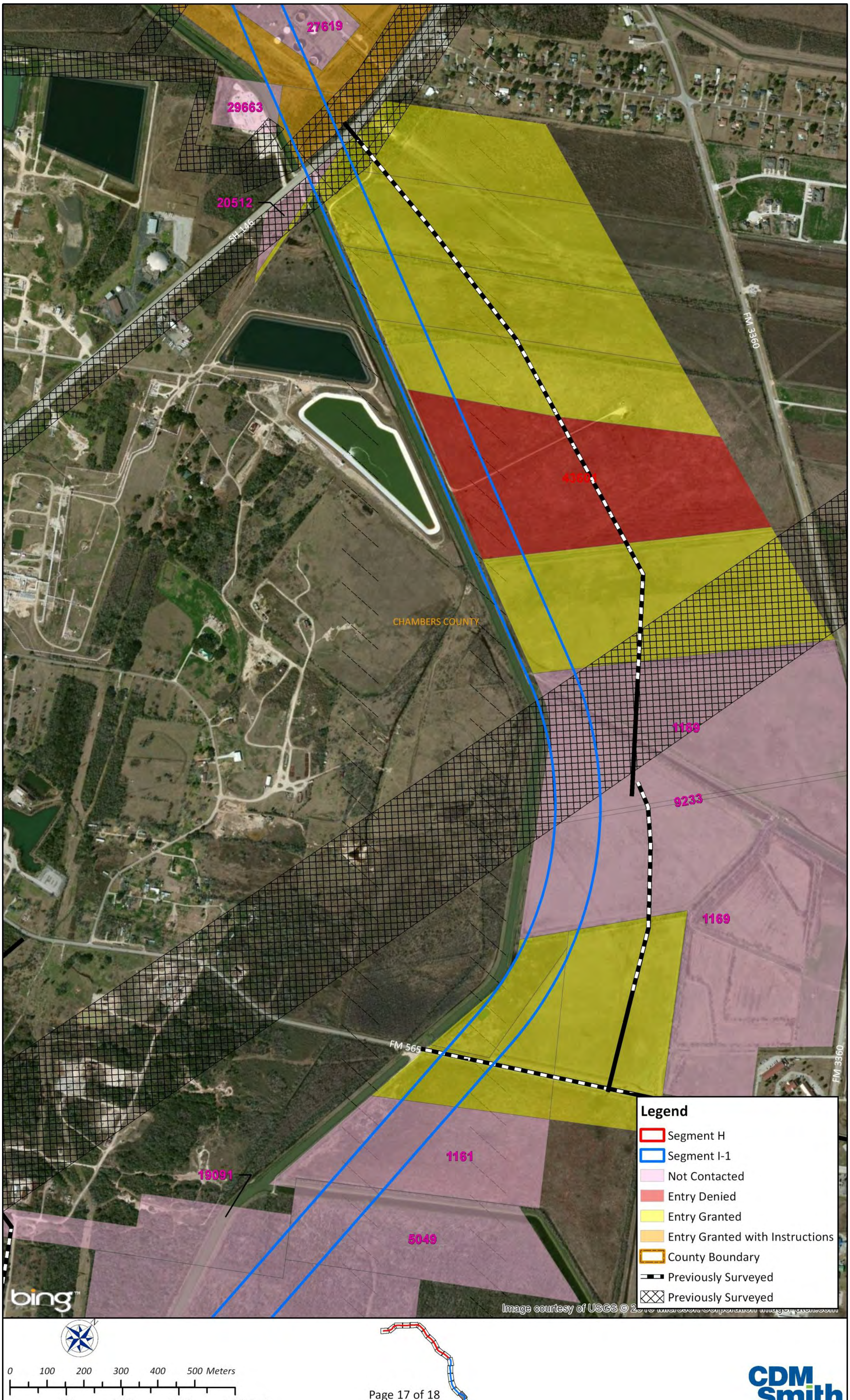


Figure 6-49. Parcels not Tested, Page 17 of 18.

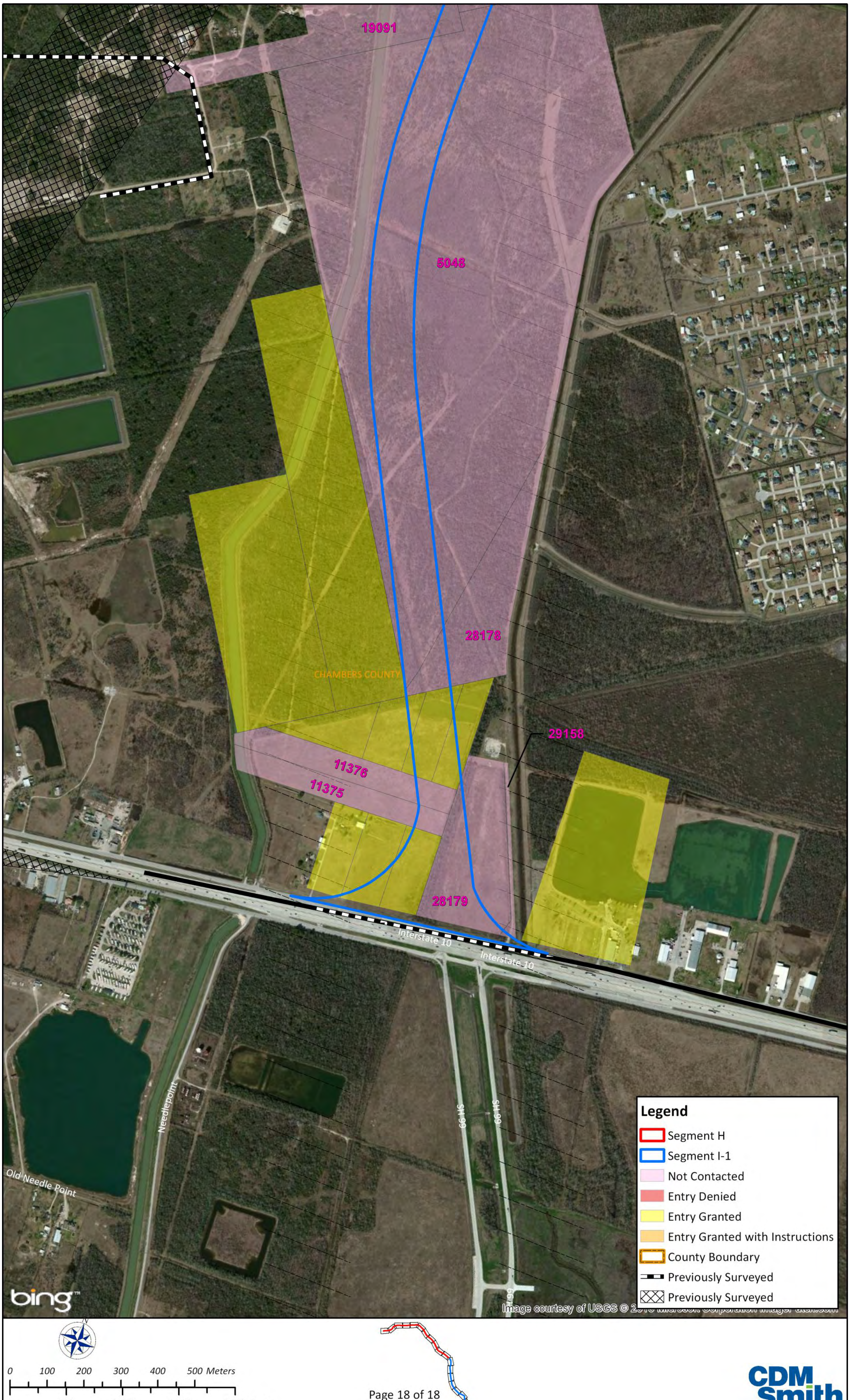
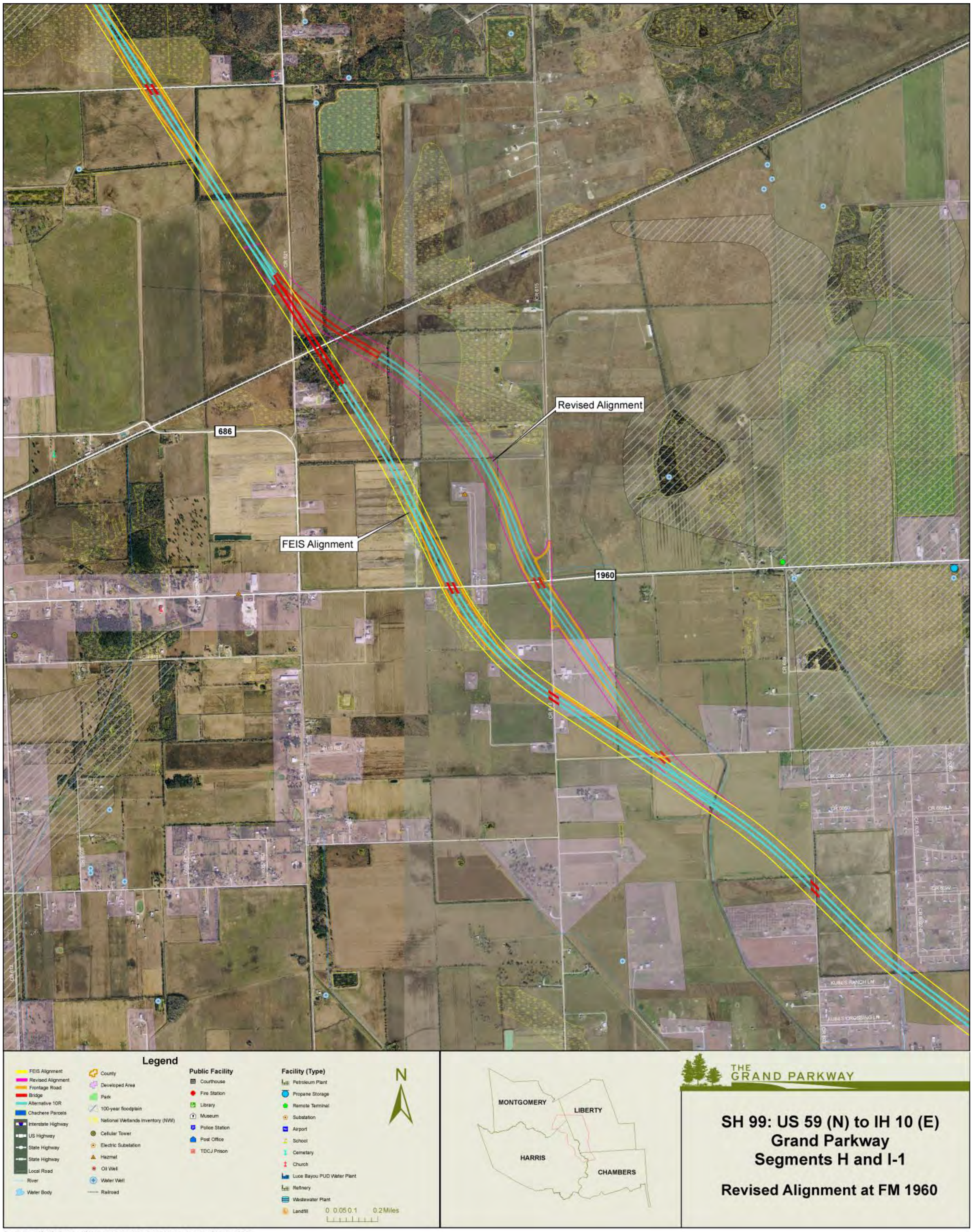


Figure 6-50. Parcels not Tested, Page 18 of 18.



Source: H-GAC 2010, USDA NAIP 2009, HNTB 2013, Liberty County CAD

Figure 6-51. Alignment Shift at FM 1960.

areas higher than they should have been. A remedy to this flaw would be to develop a drainage model of the area prior to the construction of the irrigation canals at a suitable scale.

6.6 Overall Assessment of the APE

One of the factors affecting the intensive archaeological survey was the two different ecoregions the APE traversed. All of Segment H inside of Montgomery and Harris Counties, and a part inside of Liberty County, fall within the Flatwoods (35f) ecoregion. The topography of this region, as described in Section 2, is mostly flat with some gentle slopes. The soils have more sand and less clay than the neighboring ecoregions, and the tree canopy is mostly pine. Testing is this area was easy as the sand presented little resistance to shovel testing. This contrasts sharply with the conditions found in the Northern Humid Gulf Costal Prairies (34a) ecoregion of Liberty and Chambers counties. Similar to the Flatwoods ecoregion, the topography is relative flat with some rolling hills. The soils contain more clay and less sand, and the main vegetative cover is grass. Testing of the soil was challenging. The high temperature of the summer combined with sparse rainfall caused the ground to be very hard and induced the Vertisols to form deep wide cracks. These soils were challenging to test, but with patience and perseverance, shovel testing was possible.

Differences between the two ecoregions are also seen in the development and land use along the APE. The portion of Segment H in the Flatwoods ecoregion is mostly in pine and hardwood forest. The main development found along the APE is residential with some commercial and even fewer industrial establishments. Tree farming and harvesting is a big industry in parts of the APE. The land of Segment H and all of Segment I-1 within the Northern Humid Gulf Costal Prairies ecozone is mostly under cultivation of one form or another or in pasture. However, in Chambers County, oil exploration is a major industry and exists alongside agricultural pursuits. Very little of the APE is actually developed, falling instead inside agricultural fields. Small clusters of residences are found beside the APE along with farmsteads.

The disjunctive nature of the parcels also presented a unique challenge. Following the field methods presented in Section 3 and outlined in the *Antiquities Permit Application Form,* isolated parcels that had three acres or more within the APE had one STP excavated for every three acres. Isolated parcels with less than three acres inside the APE only had one STP excavated. When parcels fell adjacent to each other, they were viewed as one continuous parcel. Their combined acreage within the APE dictated if one or more STP was excavated.

Although challenging at times, the parts of the APE where right of entry had been obtained were subjected to testing. This resulted in the identification of only one archaeological site. The few known archaeological sites within the vicinity of the APE suggests that the likelihood of encountering additional sites is low, but not unlikely.

Additional field work will be needed to test the parcels that were not examined once right of entry has been obtained.

Section 7 - Recommendations

This section presents the results of the intensive archaeological survey conducted for the Grand Parkway Association (GPA) for the proposed Grand Parkway Segments H and I-1 located in parts of Montgomery, Harris, Liberty, and Chambers counties, and makes recommendations based on the archaeological evidence recovered.

7.1 Introduction

This project was undertaken to identify any archaeological resources within the APE that are eligible for listing on the NRHP. This was accomplished by conducting an intensive archaeological survey survey of the APE to generate a preliminary description of any archaeological sites that were present.

The parcels that were tested are listed in Table 7-1. The parcels that were previously surveyed are given in Table 7-2. Most of these parcels were partially surveyed previously. The remainder that was not previously surveyed was either tested or not tested, depending on right of entry status. The properties that were not tested during this survey and in need of further testing are given in Table 7-3.

Table 7-1. Parcels that were Tested, by County.

Chambers County									
1160	14404	14404	14405	14411	14414	19689	23478	32611	43460
43462	43462	43471	44773	44773	50530				
Harris County									
0432250000002					0432250000021				
Liberty County									
10024	17104	17104	17104	19973	19973	25251	25257	25381	25386
30203	30328	32825	32825	32825	53693	69467	69479	69481	69482
69489	69492	69555	69566	69571	69571	69571	69571	102064	104025
104025	134423	136678	136736	137350	141245	152975	168774	172581	176630
214056	214065	214067	214071						
Montgomery County									
R108183	R108187	R108188	R108189	R108190	R125125	R125126	R125152	R125153	R125155
R125157	R125167	R125168	R125184	R125223	R125224	R125226	R138031	R138032	R138033
R138035	R138037	R138038	R138039	R138041	R138042	R138043	R138044	R138045	R138049
R138050	R138056	R138057	R138059	R163246	R163247	R163259	R163260	R213720	R225083
R225083	R230102	R233247	R253667	R269882	R42051	R42058	R42062	R42064	R42068
R42069	R42081	R42091	R42097	R42107	R42130	R42138	R42139	R42140	R42145
R42158	R52601	R52617	R52618	R52646	R52670	R53888A	R53888B	R58659	R58661
R70855	R70856	R70862	R77386	R77387					

Table 7-2. Previously Surveyed Parcels, Partial or Whole.

Chambers County									
1169	1169	4715	4715	4724	4724	5910	9233	13233	13233
13233	17107	17107	20512	20512	20539	20582	20582	20582	21415
29505	36261	36262	43462	50530					
Liberty County									
15703	15703	15703	19973	28413	31155	31810	167729	167732	
Montgomery County									
R53888A									

Table 7-3. Parcels That Need to be Tested.

Chambers County										
1161	1169	1169	1169	1878	4715	4724	4724	5048	5049	5910
9233	11375	11376	13233	13234	13234	16226	17107	19091	20512	20582
20582	21415	27619	28178	28179	29158	29663	36261	43601		
Harris County										
0432250000001	0432250000003	0432250000006	0432250000008	0432250000020	0432250000021					
Liberty County										
15702	15703	15703	15710	17098	17098	25200	25413	25414	26617	26716
28413	28559	28559	29668	29897	29901	29915	30206	30230	30273	30318
30318	30333	30334	30336	30337	30350	30769	30950	30950	30952	30985
30986	31028	31311	31312	31635	31810	53686	53686	53686	53686	53686
53686	53686	53686	53686	53686	53686	53686	53686	53686	53686	69474
69474	69491	69492	69502	69502	69502	69553	69553	69557	69557	69557
69558	69558	69560	69562	102052	102327	102327	102327	108080	109302	113472
120208	121732	121732	128292	128292	134420	134421	134422	134424	134425	134426
134427	134428	134429	134430	134431	134463	134465	134466	134467	135967	137357
142388	152973	153765	167361	167683	167728	167729	167731	167732	169019	169053
172041	172497	172498	173059	176832	177030	177032	179618	201060	201060	201060
201190	214065	214066	214068	214069	214070	214072				
Montgomery										
99999a	99999a	99999b	R125128	R125169	R125170	R125186	R125187	R125188	R125200	R125201
R125202	R125225	R128883	R128884	R138034	R138040	R138046	R138053	R144429	R163245	R222169
R236994	R243168	R261644	R42044A	R42044B	R42045	R42046	R42046A	R42046A	R42046B	R42067
R42070	R42073	R42074	R42075	R42082	R42084	R42085	R42092	R42092	R42094	R42096
R42118	R42126	R42131	R42134	R42136	R42137	R42161	R52540	R52618	R52642	R52647
R52665	R52667	R52679	R52680	R52681	R52682	R69387	R69391	R69392	R70824	R70826
R70851	R70854									

Archaeological Findings

One new archaeological site was documented within the APE, site 41MQ300.

7.1.1 41MQ300

Site 41MQ300, located during the survey of a previous alignment of Segment H, is a low-density, prehistoric lithic scatter from an undetermined cultural context with a small undetermined historic component. The prehistoric component of the site represents a short-term occupation by an unidentified prehistoric cultural group. . The historic probably dates to the mid-to-late 20th century.

It is difficult to draw conclusions of settlement activities and structure from so few historic and prehistoric artifacts. Since no diagnostic historic or prehistoric material was recovered it is not possible to assign the occupation to any cultural or temporal period other than undetermined prehistoric and mid-to-late 19th century historic occupation.

7.1.1.1 National Register Eligibility

No features or buried deposits were found. As a result, the site has limited research potential and is not considered potentially eligible for listing on the NRHP under Criterion D. Criteria A, B, and C do not apply. No further archaeological work is recommended for the site.

7.1.1.2 Recommendations

No further archaeological work is recommended for site 41MQ300.

7.2 Parcels not Tested

One unique aspect of this project is that 56% of the APE was not tested. This is due to several reasons, primarily because RODS Surveying did not contact the owners for a majority of the parcels seeking right of entry, for reasons unknown to the author. This created a dispersed patchwork of parcels, representing 33% of the APE, which was available for testing. Table 7-3 lists the parcels that were not tested during this survey. Once right of entry is obtained, additional field work will be needed to test these parcels by a qualified archaeologist.

7.3 Alignment Shift at FM 1960

An additional alignment shift has just recently been made at FM 1960 almost a year after the competition of the field work. The new alignment falls outside the area previously surveyed and will need to be examined by a qualified archaeologist.

7.4 Conclusion

One previously unknown archaeological site (41MQ300) was discovered. Site 41MQ300 is a low-density, prehistoric scatter representing a short-term occupation by an unidentified cultural group, with a small historic mid-to-late 20th century component consisting of a single metal wire fragment. The sites has limited research potential and is not considered potentially eligible for listing on the National Register of Historical Places (NRHP) under Criterion D. Criteria A, B, and C do not apply. No further archaeological work is recommended for this site.

Over 56% of the APE was not tested. This included parcels where RODS Surveying did not contact the owner, and the area of the alignment shift at FM 1960. These areas will need to be examined by a qualified archaeologist once right of entry has been secured. For the 33% percent of the parcels that were tested, no further archaeological work is recommended.

If archeological materials or human remains are identified within the ROW during construction, or a department-designated material source, all construction and related activities must cease. The find is to be reported to the TxDOT project inspector or the area engineer in accordance with TxDOT's Emergency Discovery Guidelines.

If archeological materials or human remains are introduced into the ROW or easements in materials obtained from a material source under option to the contractor, all use of materials from this source must cease and the find reported to TxDOT project inspector or the area engineer in accordance with TxDOT's Emergency Discovery Guidelines.

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Appendix A -

Artifact Inventory

Table A-1. Prehistoric Artifact Catalog.

Cat. No.	Site	Unit	Depth	Group	Class	Type	Subtype 1	Subtype 2	Deb SG	Raw Material	Cortex	HT	Length	Width	Thickness	Weight	Number	Comment
1	41MQ300	STP 51	20-30	Lithic	Chipped Stone	Debitage	Shatter		1	light gray inclusions		y				0.6	1	
1	41MQ300	STP 51	20-30	Lithic	Chipped Stone	Debitage	Shatter		3	light gray inclusions		y				13.5	1	
2	41MQ300	STP 52	20-30	Lithic	Chipped Stone	Debitage	Shatter		1	light gray inclusions		y				0.9	1	
3	41MQ300	STP 55	20-30	Lithic	Chipped Stone	Debitage	Shatter		1	light gray inclusions		n				2.6	6	
3	41MQ300	STP 55	20-30	Lithic	Chipped Stone	Debitage	Shatter		1	light gray inclusions		y				1.5	2	
3	41MQ300	STP 55	20-30	Lithic	Chipped Stone	Debitage	Shatter		1	medium gray		n				2.3	7	
3	41MQ300	STP 55	20-30	Lithic	Chipped Stone	Debitage	Shatter		1	medium gray		y				2.5	3	
3	41MQ300	STP 55	20-30	Lithic	Chipped Stone	Debitage	Shatter		1	gray		n				0.8	2	
3	41MQ300	STP 55	20-30	Lithic	Chipped Stone	Debitage	indeterminate flake		1	gray		y				0.1	1	
3	41MQ300	STP 55	20-30	Lithic	Chipped Stone	Debitage	biface reduction		1	gray		y				0.9	1	
4	41MQ300	STP 58	20-30	Lithic	Chipped Stone	Debitage	Shatter		1	light gray inclusions		y				1	1	
4	41MQ300	STP 58	20-30	Lithic	Chipped Stone	Debitage	Shatter		1	light gray inclusions		n				1.1	2	
4	41MQ300	STP 58	20-30	Lithic	Chipped Stone	Debitage	Shatter		2	light gray inclusions		y				6.6	1	
4	41MQ300	STP 58	20-30	Lithic	Chipped Stone	Debitage	Shatter		2	gray		y				1.1	1	
4	41MQ300	STP 58	20-30	Lithic	Chipped Stone	Debitage	Shatter		1	gray		n				2.7	4	
4	41MQ300	STP 58	20-30	Lithic	Chipped Stone	Debitage	Shatter		2	gray		n				3	1	
4	41MQ300	STP 58	20-30	Lithic	Chipped Stone	Debitage	Shatter		1	medium gray		n				0.9	1	
4	41MQ300	STP 58	20-30	Lithic	Chipped Stone	Debitage	indeterminate flake		1	medium gray		n				0.4	1	
4	41MQ300	STP 58	20-30	Lithic	Chipped Stone	Debitage	Shatter		1	gray		n				1	1	
4	41MQ300	STP 58	20-30	Lithic	Chipped Stone	Debitage	Shatter		2	medium gray		n				3.8	1	

Table A-2. Historic Artifact Catalog.

Site #	Cat. #	STP #	Level	Depth CM BS	Functional Group	Material Class	Type	Subtype 1	Subtype 2	Subtype 3	#	Thick (mm)	Comments
41MQ300	1	STP 58		10	Other	Metal	Wire	Fragment			1		

Appendix B -

Site forms

41MQ300

State Of Texas

Archeological Site Form

Field ID CDMS 1
Form Date 10/27/2010

General Site Information

Site Name ☐ Revisit

Site Type lithic scatter;occupation

Explanation of Type
small lithic scatter from an undetermined prehistoric occupation; wire fragment from an undetermined historic occupation.

Project and Permit

Project Name Grand Parkway Segments H and I-1 û SH 99: US 59 (N) to IH 10 (E)
Project Number **Project Funding** Texas Department of Transportation
Permit Number 6233 **Permit Source** Texas Historical Commission

Recorder Information

Name J. Howard Beverly, Jr.
Phone 859 254 5759 **Fax** 859 254 5764
Email beverlyjh@cdmsmith.com
Affiliation CDM Smith
Address 1648 McGrathiana Parkway/Suite 340
Lexington
KY 40511
☑ **Recorder Visited Site**

Sources of Information

Owner
Benny L. and Liz Polk
20237 Monday Hargrove Rd.
New Caney, TX 77357-7239

Informant

Additional Sources

Work Performed

Observation/Recording Date June 26, 2012

Surface Inspection/Collection Date June 26, 2012

Method Controlled û systematic shovel tests every 10 meters. 13 probes were placed across the site and only 4 were positive.

Mapping Dates June 26, 2012

Method compass and pace map plotted to scale
GPS data collection to create digital scale map; compass and pace map plotted to scale

Testing Dates

Method

Excavation Dates

41MQ300

State Of Texas

Archeological Site Form

Field ID CDMS 1
Form Date 10/27/2010

Method

Records and Materials

Records
digital photos;paper map;shovel test notes

Materials Collected
40 undiagnostic debitage flakes;1 metal wire fragment

Special Samples

Temporary Housing CDM Smith, 1648 McGrathiana Parkway, Suite 340, Lexington KY 40511

Permanent Housing

Location

Primary County Montgomery **Location in County**

Other Counties

USGS Map and Quad Splendora (3095-113)

UTM Zone 15 **Easting** 294035.925975 **Northing** 3337120.67918 **Datum** NAD 1983

Elevation 97 **Elevation Range** 95-100

Description of Location
At the North-east corner of the intersection of FM 1485 and Willaby Road

Environment

Nearest Natural Water 250 m northeast of a gulley

Major Drainage San Jacinto River

Creek Drainage Church House Gulley

Soil Description and Reference
Splendora fine sandy loam; Soil Survey of Montgomery County, Texas, 1972;
http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

Percentage Surface Visible 10

Surface Texture sandy loam

Soil Derivation ☑ **Alluvial** ☐ **Colluvial** ☐ **Eolian** ☐ **In Situ** ☐ **Marine**

Other Soils

41MQ300 | **State Of Texas** | **Field ID** CDMS 1

Archeological Site Form

Form Date 10/27/2010

Environmental/Topographical Setting
cleared grass field on a relative flat surface

Site Conditions

Circumstances Affecting Observation
field in grass

Site Condition 60 % remains. Trees cleared and possible structure/trailer in the recent past

Current Land Use
open field

Natural Impacts

Artificial Impacts

Future Impacts
partially within the proposed alignment for the Grand Parkway segment H

Cultural Manifestations

Time Period of Occupation
Prehistoric;Historic

Basis for Time Period
undiagnostic lithic debris; metal wire fragment

☐ **Single Component** ☑ **Multiple Component** ☐ **Component Unknown**

Basis for Component
one STP yielded lithic debris and a metal wire fragment.

Cultural Features

Approximate Site Size 10 m east-west by 40 m north-south

Basis for Determination extent of artifact scatter determined by presence of positive STP

Top of Deposit Below Surface 10

Basis for Determination STP excavation

Bottom of Deposit 30

Basis for Determination STP excavation

41MQ300 | State Of Texas | Field ID CDMS 1

Archeological Site Form

Form Date 10/27/2010

Artifactual Materials Observed

Discussion of Site

the site is a small lithic scatter from an undetermined prehistoric cultural context. The historic component is represented by a single fragment of metal wiring, probably related to a property fence nearby. Similar to site 41MQ247 that is located approximately 870 m west-south-west of the site.

Registration and Recommendations

Registration Status

State Arch Landmark	Not Eligible	**Conservation Easement**	Not Eligible
Registered TX Landmark	Not Eligible	**National Register**	Not Eligible

Registration Comments

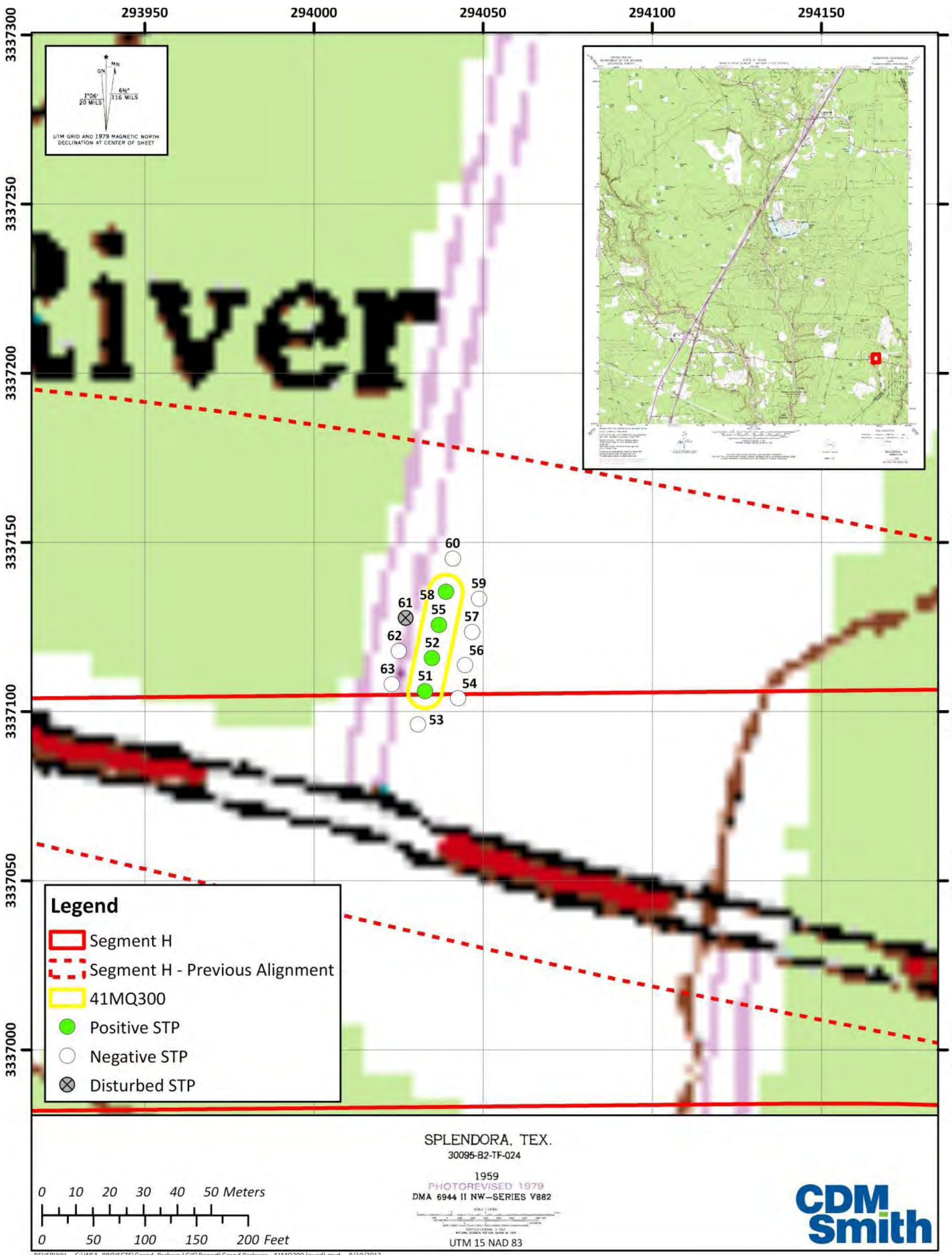
Research Value

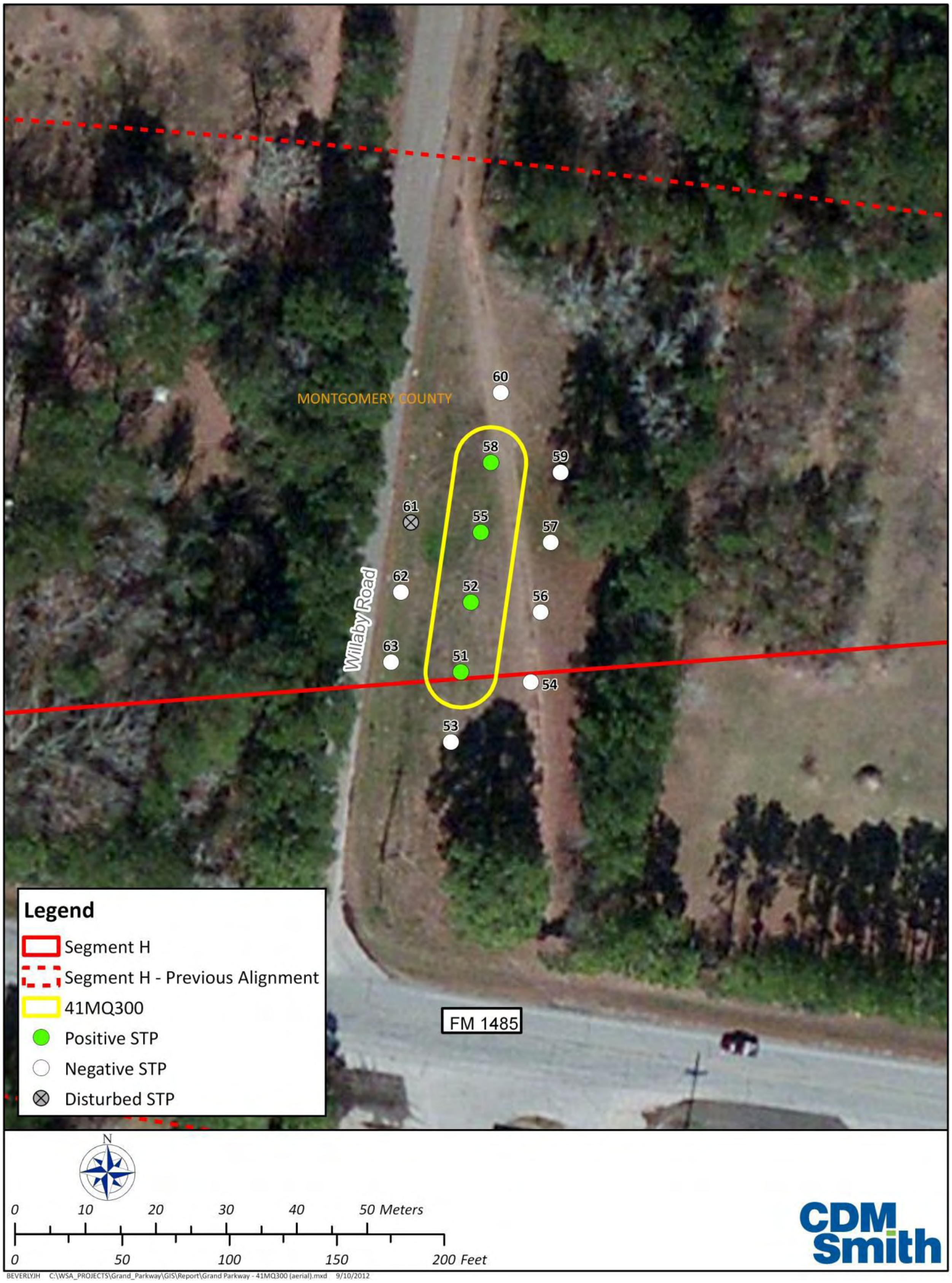
low research potential

Further Investigations

No further archaeological research is limited.

Attachments


293950
294000
294050
294100
294150
3337300
3337250
3337200
3337150
3337100
3337050
3337000
River
60
59
58
61
55
57
62
52
56
63
51
54
53
Legend
Segment H
Segment H - Previous Alignment
41MQ300
Positive STP
Negative STP
Disturbed STP
SPLENDORA, TEX.
30095-B2-TF-024
1959
PHOTOREVISED 1979
DMA 6944 II NW—SERIES V882
UTM 15 NAD 83
0 10 20 30 40 50 Meters
0 50 100 150 200 Feet
CDM Smith
UTM GRID AND 1979 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET
BEVERLYJH C:\WSA_PROJECTS\Grand_Parkway\GIS\Report\Grand Parkway - 41MQ300 (quad).mxd 9/10/2012



MONTGOMERY COUNTY
60
58
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56
Willaby Road
63
51
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FM 1485
Legend
Segment H
Segment H - Previous Alignment
41MQ300
Positive STP
Negative STP
Disturbed STP
N
0 10 20 30 40 50 Meters
0 50 100 150 200 Feet
CDM Smith
BEVERLYJH C:\WSA_PROJECTS\Grand_Parkway\GIS\Report\Grand Parkway - 41MQ300 (aerial).mxd 9/10/2012

Texas Department of Transportation®
DEWITT C. GREER STATE HIGHWAY BLDG. • 125 E. 11TH STREET • AUSTIN, TEXAS 78701-2483 • (512) 463-8585

August 19, 2013

Section 106/Antiquities Code of Texas: Review and Comments (Permit #6233)
SH 99 (Segment H & I1) Road Project (CSJ: 3510-07-003, -08-001, -08-002, -09-001, -10-001)
Houston District; Harris, Montgomery, Liberty, and Chambers Counties

Ms. Patricia A. Mercado-Allinger
Division Director/State Archeologist
Archeology Division
Texas Historical Commission
PO Box 12276
Austin, TX 78711-2276

Dear Ms. Mercado-Allinger:

The proposed project will be undertaken with Federal funding. In accordance with Section 106 and the First Amended Programmatic Agreement among the Texas Department of Transportation (TxDOT), the Texas State Historical Preservation Officer (TSHPO), the Federal Highway Administration (FHWA), and the Advisory Council on Historic Preservation and the Antiquities Code of Texas and the Memorandum of Understanding between the Texas Historical Commission (THC) and TxDOT, this letter initiates consultation for the proposed undertaking.

The proposed project would construct Segments H and I1 of the State Highway (SH) 99 outer loop. Segment H begins at US Highway (US) 59 in Montgomery County, crosses Harris County, and terminates at US 90 in Liberty County. Segment I begins at US 90 in Liberty County and terminates at Interstate Highway (IH) 10, in Chambers County. The proposed roadway would be an at-grade, four main-lane, controlled-access toll road with intermittent frontage roads located within a 400-foot wide right-of-way (ROW). The proposed project includes bridges over drainages and grade separations at major intersections. The proposed project is approximately 37.4 miles in length. Approximately 2007 acres of new right-of-way (ROW) would be acquired; all work would remain within the proposed 400-ft wide corridor. The area of potential effect is defined as the project length, the proposed ROW and any existing ROW that may be utilized, and the depth of construction impacts, no more than 75-ft in depth.

CDM Smith, an archeological subcontractor to HNTB Corporation, the prime consultant for the Houston District, conducted a background review and an intensive survey under Permit #6233 for the proposed project. No previously recorded archeological historic properties were identified within the APE of this proposed segment. The closest recorded site, 41MQ245 – a late prehistoric open campsite, is located 50 meters outside of the APE on an unnamed tributary of Peach Creek. Two additional recorded sites, 41MQ246 and MQ247 are located within 1,000 meters of the APE.

CDM Smith shovel-tested approximately 33 percent of the APE during this survey, 11 percent of the APE was previously surveyed and 56 percent was denied or lacked right-of-entry (ROE). A total of 114 shovel-tests were excavated during the pedestrian survey. A single archeological site was encountered during this survey on the north side of Farm-to-Market Road 1485 at Willaby Road. The site, a prehistoric open campsite, was recorded as 41MQ300. Thirteen shovel-tests were excavated to delineate the site boundaries. Shovel-testing resulted in the documentation of 39 pieces of prehistoric lithic debitage and a single piece of historic metal wire. CDM Smith recommends that no further archeological investigation is needed on 41MQ300, the site has limited research potential and is not considered eligible for listing on the National Register of Historic Places (NRHP) or as a State Archeological Landmark (SAL). However, it should be noted that 56 percent of the APE remains unsurved due to a denial or lack of ROE and will still need to be surveyed once the property or access has been acquired.

Please find attached for your review and comments the CDM Smith draft report; *Intensive Archeological Survey of the Grand Parkway, Segments H and I-1, Montgomery, Harris, Liberty, and Chambers Counties*. TxDOT requests your concurrence that the report is satisfactory and acceptable; minor comments have already been submitted to CDM Smith. CDM Smith has already responded to TxDOT's comments and is making the appropriate changes for the final report. TxDOT requests your concurrence on the following recommendations, 1) that the portion of the APE that has been surveyed by this 2012 survey is complete and does not warrant any additional archeological investigation, 2) that the remaining 56 percent of the APE remaining unsurveyed due to a denial of ROE will need to be surveyed once these parcels have been acquired or access is granted, and 3) Site 41MQ300 is not considered eligible for listing as an archeological property (36 CFR 800.16(l)) on the NRHP or as an SAL (13 TAC 26.8) and no further investigation is warranted. TxDOT further recommends that the remainder of the archeological inventory be deferred to allow NEPA processing and property acquisition to proceed; once the property has been acquired, TxDOT shall be obligated to complete the inventory. If you have no objections to the above request and recommendation, and have no comments on this report and find it acceptable, please sign below to indicate your concurrence and stamp the draft cover as acceptable.

Thank you for your consideration in this matter. If you have any questions or further need of assistance, please contact Allen Bettis of the TxDOT Archeological Studies Program at (512) 416-2747.

Sincerely,

Allen C. Bettis Jr.
Archeological Studies Program
Environmental Affairs Division

cc w/o attachments: J. Howard Beverly – CDM Smith – Lexington, KY
Susan Theiss – Houston District APD
ACB JR PA File

9-6-13

Concurrence: Date:
for Mark S. Wolfe, State Historic Preservation Officer

Intensive Archaeological Survey of the Grand Parkway, Segments H and I-1, Montgomery, Harris, Liberty, and Chambers, Counties

By:

J. Howard Beverly, Jr., RPA, GISP
J. David McBride, RPA
J. Chris Rankin
Ann S. Wilkinson

Submitted by:

CDM Smith
1648 McGrathiana Parkway, Suite 340
Lexington, KY 40511
Tel 859-254-5759
Fax 859-254-5764

Prepared for Client:

HNTB Corporation
2950 North Loop West
Ste. 900
Houston, Texas 77092
(713)354-1500

DRAFT REPORT ACCEPTABLE
by Mark H Denton
for Mark Wolfe
Executive Director, THC
Date 9-6-13
Track#

J. Howard Beverly

J. Howard Beverly, Jr., MA, RPA, GISP

Texas Historical Commission Antiquities Permit: 6233

Principal Investigator: J. Howard Beverly, Jr., RPA, GISP
Contact: (859) 254-5759 Ext. 106 or beverlyjh@cdmsmith.com

Lead Federal Agency: Federal Highway Administration

July 2012